

KNOWLEDGE ACQUISITION AND MARITIME LOGISTICS VALUE: AN INTER-ORGANISATIONAL RELATIONSHIP PERSPECTIVE

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ABSTRACT

Maritime logistics value (i.e. improving operational efficiency and service effectiveness in maritime logistics) is one of the strategic goals that maritime operators (i.e. port operators, shipping lines and freight forwarders) want to achieve. Due to the lack of a systematic approach towards maritime logistics management, however, existing literature has yet to clearly define what strategic direction should be taken to accomplish such goals. This thesis proposes that a knowledge-based strategy is the most desirable alternative, having diagnosed its effectiveness in creating and sustaining maritime logistics value.

The thesis consists of theoretical and empirical sections. The theoretical part reviews the work of maritime logistics and operators within the context of global logistics and strategic management theory (especially, knowledge-based and inter-organisational relationship perspectives). The theoretical review clarifies the strategic objective of maritime operators, and highlights the importance of a knowledge management strategy towards such a business goal. Based on the literature review, the research develops a conceptual framework that shows the positive relationship between knowledge acquisition and maritime logistics value, and the role of social network embeddedness in acquiring knowledge.

The empirical work undertaken to examine the conceptual relationship adopts a qualitative approach: an explorative case study and a Delphi survey. The explorative case study utilises an interview method with a semi-structured questionnaire, and two rounds of the Delphi survey are then conducted by collecting data from a panel of experts in the field. The two research methods are applied to the maritime logistics industry in Korea, where the strategic significance of maritime logistics value becomes ever more obvious. The empirical findings indicate that maritime operators acquire useful knowledge through being embedded in social co-operative and co-opetitive networks, and the acquired knowledge helps them to maximise the maritime logistics value.

The work presented hereafter provides a meaningful insight for managers, policy makers and academic researchers into the knowledge management strategy and effective administration of a maritime logistics system in the context of inter-organisational relationship. However, this thesis has not examined the way to apply the acquired knowledge on an internal basis of an organisation, and focuses solely on a qualitative approach. It is suggested that a quantitative and in-depth discussion on the knowledge-based maritime logistics research within an intra-organisational level be made by linking maritime operators' strategy with macro-issues in global supply chains.

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.

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LIST OF ABBREVIATION

APL	American President Lines Co., Ltd
CIS	The Commonwealth of Independent States
CKYH	Cosco/K-line/Yanming/Hanjin Alliance
COSCO	China Ocean Shipping Company Co., Ltd.
COSCON	COSCO Container Lines Co., Ltd.
CSCL	China Shipping Container Lines Co., Ltd.
CSCMP	Council of Supply Chain Management Professionals
DPC	Dalian Port Company Co., Ltd.
DPCT	Dalian Port Container Terminals Co., Ltd.
ERP	Enterprise Resource Planning
EDI	Electronic Data Interchange
EPOS	Electronic Point of Sale
ERP	Enterprise Resource Planning
EU	European Union
FDI	Foreign Direct Investment
FF	Freight Forwarders
FF1	Sammin Co., Ltd.
FF2	Highway Logistics Co., Ltd.
FF3	Kook Yang Logitech Co., Ltd.
FK	Firm-specific Knowledge
HIT	Hong Kong International Terminals Co., Ltd.
HKT	Hutchison Korea Terminals Co., Ltd
HJS	Hanjin Shipping Co., Ltd.
HMM	Hyundai Merchant Marine Co., Ltd.
HPH	Hutchison Port Holdings Co., Ltd.
KIT	Korea International Terminals Co., Ltd.
MK	Market-specific Knowledge
MOL	Mitsui OSK Lines Co., Ltd.
MSC	Mediterranean Shipping Company Co., Ltd.
NAFTA	The North American Free Trade Agreement
NOL	Neptune Orient Lines Co., Ltd.
NYK	Nippon Yusen Kaisha
OOCL	Orient Overseas Container Line
PSA	Port of Singapore Authority
QCIT	Qingdao Candon International Trade Co., Ltd.
QQCT	Qingdao Qianwan Container Terminals Co., Ltd.
RBV	Resource-based View
RFID	Radio-frequency Identification
ROA	Return on Assets
ROI	Return on Investment
SCP	Industry Structure-Conduct-Performance Model
SCT	Shanghai Container Terminals Co., Ltd.
SD	Standard Deviation
SL	Shipping Lines
SL1	Hyundai Shipping Co., Ltd.
SL2	Kmtc Co., Ltd.
SL3	Sinokor Co., Ltd.
SPICT	Shanghai Pudong International Terminals Co., Ltd.
WTO	World Trade Organisation
TAA	The Transatlantic Agreement

TEU	Twenty-foot Equivalent Units
TO	Port Terminal Operators
TO1	Hanjin Pacific Co., Ltd.
TO2	Korea Express Co., Ltd.
TO3	Sebang Co., Ltd.
UNCTAD	The United Nations Conference of Trade and Development
YICT	Yantian International Container Terminals Co., Ltd.
YML	Yang Ming Lines Co., Ltd.

CHAPTER 1 INTRODUCTION

1.1 RESEARCH BACKGROUND

Over the last few decades, world-wide business environments have changed rapidly, affected as they have been by the wave of globalisation. Globalisation has triggered international trade between countries and quickened the growth of multinational corporations. Globalised businesses have brought about the belief that globally dispersed operations need to be managed in the most efficient and effective way for firms' greater profit. In this sense, effectively administrating the world-widely linked activities of a firm – that is global logistics management – has become one of the most significant considerations of international strategic management. Global logistics is referred to as the entirety of activities which involve logistics flows (i.e. all the relevant activities of the flow of goods from the origin to ultimate destination, including transportation, warehousing, purchasing, distribution, etc.) in two or more nations across the globe (Council of Supply Chain Management Professionals; 2007; Gourdin, 2001; Sheu, 2004).

The aforementioned challenges in global business have caused the maritime transport system to be seen in a way that is strategically different from those of past decades. Historically, maritime transportation was regarded as a simple and independent system which moves cargoes across the world by sea. The main required factor for the maritime transport system was to move cargoes at the lowest possible cost. Today, having experienced the aforementioned environmental fluctuations, the traditional view of the maritime transport system has shifted. The new recognition dominant in global business management is that the maritime transport system is a component of globally inter-linked logistics functions, and offers integrated logistics services including carrying goods by ocean. Such a view has given rise to the use of the 'maritime logistics' concept, which reflects on both the traditional and currently required logistical role of maritime transportation.

Maritime logistics is referred to as the process of planning, implementing and managing the movement of goods and information which is involved in the ocean carriage. The

principal aim of a maritime logistics system is to enhance the value of the system, i.e. maritime logistics value. The maritime logistics value can be maximised when the maritime operators offer quick, responsive, flexible and reliable services at a lower price. Greater maritime logistics value may contribute to the improvement of the entire logistics performance, as well as the competitive advantage of maritime operators themselves. Therefore, maritime logistics value has become one of the most significant strategic goals that maritime operators (e.g. shipping and port) want to achieve and sustain for their long term competitiveness.

Along with the increasing attention paid to the maritime business as indicated above, maritime studies have also made a remarkable development. The studies examine the determinants of successful integration of maritime transport into global logistics, and its effectiveness (Bowersox, 1978; Narasimhan and Jayaram, 1998; O'Leary-Kelly and Flores, 2002; Panayides and Song, 2008); strategic alliances of maritime operators (Frankel, 1982; Brooks, 2000); the importance of maritime logistics (Panayides, 2006); issues of safety, security and environment in maritime logistics (Gaarder, Rongstad and Olofsson, 1997; Soares and Teizeira, 2001; Roe, 2007; Li and Zheng, 2008); and the efficiency and competitiveness of port/terminal (Ciullinane, Song and Gray, 2002; Tongzon and Wu, 2005; Yeo and Song, 2006).

The above studies contribute to the comprehensive understanding of the strategic significance of maritime transport within the context of global logistics. However, little research has been done to clarify how maritime operators improve maritime logistics value, in order to achieve their strategic objective from a strategic management perspective in a systematic way. This study, on the basis of the most influential theories in logistics and strategic management, identifies that a knowledge-based strategy will be the most desirable alternative. The reason for this argument may be due to the fact that existing literature ensures that knowledge management strategy can help firms to improve their operational efficiency (i.e. cost and time) and service effectiveness (i.e. flexibility, responsiveness and reliability in services). Thus, it could be expected that maritime operators can maximise maritime logistics value by successfully implementing knowledge management strategy.

The question is that how maritime operators apply the knowledge management strategy in order to accomplish their strategic goals. Unfortunately, despite the fact that the

importance of a knowledge management strategy has been addressed by logistics and strategic management scholars, existing literature has yet to clearly define the way to apply the knowledge management strategy to maritime operations, and determine the effectiveness of the strategy in their operations. For this reason, this study aims to fill such a research gap. Namely, this thesis aims at empirically examining the process of applying a knowledge management strategy to maritime operations, and diagnosing whether the knowledge management strategy could really be a good strategic alternative for maritime logistics value. Theories and practices of maritime logistics and strategic management literature are adopted as per the objectives.

1.2 RESEARCH QUESTIONS

Strategic management scholars define knowledge management as a process of knowledge acquisition and application. Thus, when discussing the way to adapt knowledge management strategy to a maritime business organisation, one should examine how maritime operators can acquire knowledge (i.e. the source of knowledge acquisition) and how the acquired knowledge can improve maritime logistics value (i.e. the application performance of knowledge). The effectiveness of the knowledge management strategy can then be diagnosed from the results. It addresses the following three sets of research questions (RQ).

***RQ1:** How could maritime operators acquire the knowledge for maritime logistics value?*

***RQ2:** How could the acquired knowledge improve maritime logistics value, and is knowledge management strategy a desirable strategic alternative for maritime operators, in order for them to improve maritime logistics value?*

RQ1 is formulated in order to explore the channel of knowledge acquisition of maritime operators. The application performance of the acquired knowledge and the effectiveness of knowledge management strategy would be examined by answering RQ2. Finally, the relevant strategic implications would be then discussed.

1.3 RESEARCH METHODOLOGY

A literature review of the work of maritime logistics and strategic management theories is initially performed in order to identify the relevant academic streams of the research issue of this study. The theoretical review clarifies the strategic objective of maritime operators, and conceptually outlines the method of how maritime operators acquire knowledge and enhance maritime logistics value. This work eventually leads to the development of a conceptual framework that shows the positive relationship between the sources of knowledge acquisition, knowledge acquisition and maritime logistics value, and the role of social network embeddedness and co-opetitive relationship in acquiring knowledge.

In order to empirically investigate the proposed conceptual relationship, this study employs a qualitative approach: an explorative case study and the Delphi survey method. The purpose of the case study is to explore some contextual phenomena and to validate the proposed relationships in the maritime logistics field. The explorative case study utilises an in-depth interview method with a semi-structured questionnaire. The interviews were conducted from April to May 2008 in Korea. The researcher went to the interviewees' companies to meet them, and all of the interviews were conducted on a face-to-face basis. A total of nine cases of maritime logistics companies in Korea were used to the explorative analysis.

Two rounds of the Delphi survey, which is an empirical method that is used to get information from experts on the research topic, are then conducted. Since the Delphi survey method allows one to collect the professional views of a panel of experts in the maritime logistics industry, the method may enable us to understand and diagnose the present status of the relationships assumed in the conceptual model in a more accurate and reliable manner.

A questionnaire for the survey is formulated based on construct operationalisation and five point numerical measurements on key variables. The quality of the Delphi survey method is evaluated by assessing the validity and reliability of the method. Subsequently, qualified panellists are selected on the basis of certain criteria to stand as experts in the Korean maritime logistics industry. After conducting a pilot test on each question, the first round of survey is launched. In the first round, the finally developed

questionnaire is distributed to the panellists, and their responses are then collected. The collected data in the first round of the survey is initially summarised by calculating ‘mean values’ and ‘standard deviations.’

Once the above is complete, the second round of the survey is launched. The questionnaire is re-sent to the panels, along with the information of the collective views of the first round of survey (i.e. the summary with the mean values and standard deviations), and is then re-collected. The purpose of attaching the collective views in the second round is to give respondents the opportunity to reconsider their previous answers, based on the group opinions answered by the other panels as a whole. After this, the conceptual relationships are examined by analysing the responses finally collected, and the propositions that are relevant to the empirical findings are suggested. Finally, strategic implications are finally discussed in the last part of the thesis.

1.4 RESEARCH SCOPE

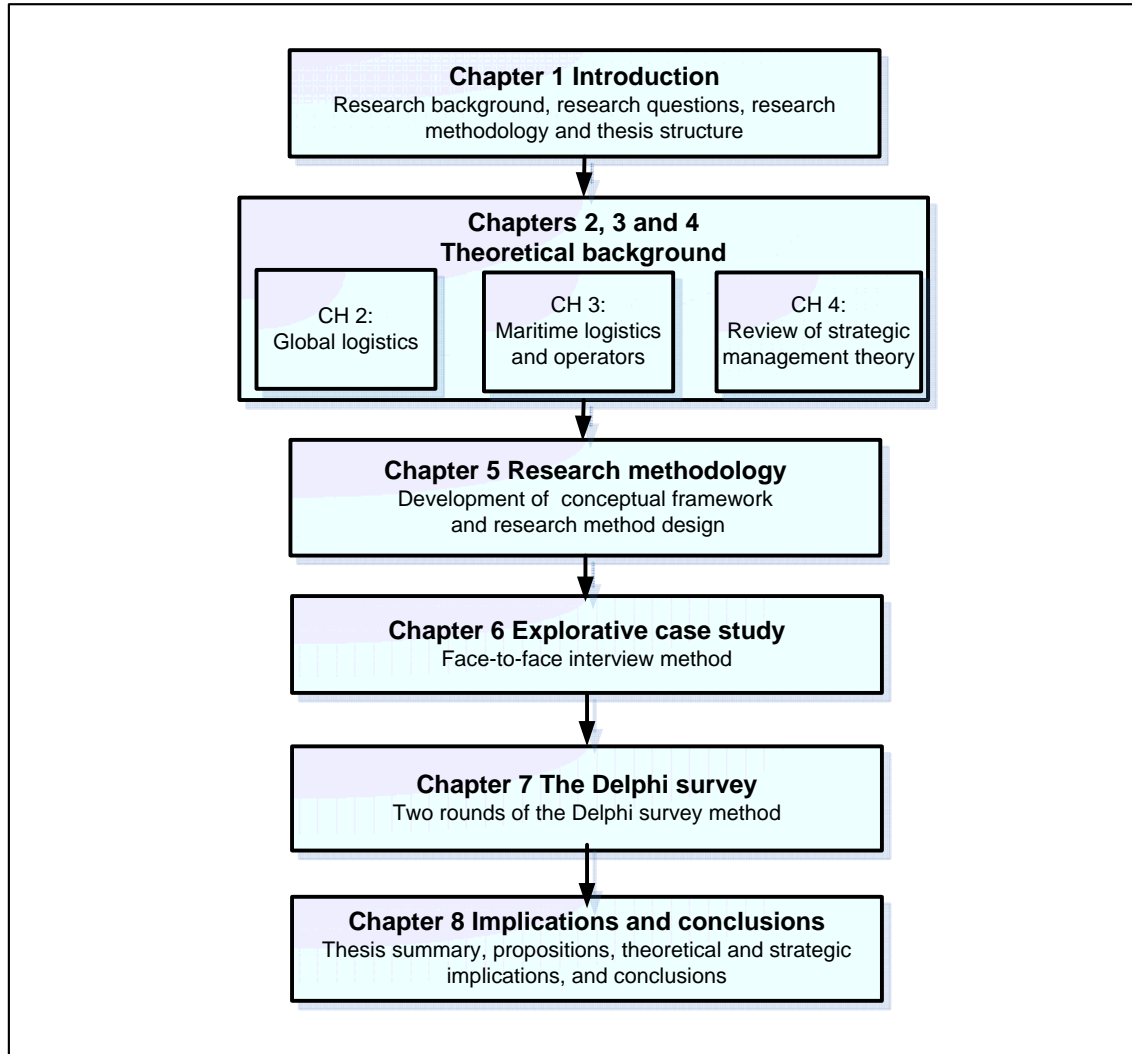
This research is primarily concerned with the strategy of maritime logistics operators. Maritime logistics operations consist of shipping, port operation and freight forwarding. Thus, the unit of the analysis in this study is the individual firms which comprise shipping lines, port terminal operators and freight forwarders.

The regional context of this study is the Korean maritime industry, as the geographic and strategic importance of the industry as a key Asian logistics centre has increased in recent years. Thus, the empirical investigation which is targeted at Korean maritime operators may derive meaningful strategic implications in maritime logistics research.

1.5 THESIS STRUCTURE

The thesis consists of a total of eight chapters. Figure 1.1 depicts the chapter structure of this thesis. Chapters 2 to 4 review the theoretical background and introduce the theoretical significance of maritime logistics, maritime logistics value and knowledge management strategy.

Figure 1. 1 Thesis Structure



Chapter 2 reviews the definitions of logistics and global logistics, and the role of maritime transportation within the context of global logistics integration. Chapter 3 introduces the concept of maritime logistics and the process of creating maritime logistics value. In this chapter the strategic goal of maritime operators (i.e. the improvement of maritime logistics value) is clarified, and the quest for a new strategic direction for maritime operators is assured. Chapter 4 reviews strategic management theories in order to explore which theory or practice would be the most helpful in solving the current strategic task of maritime operators. Key strategic theories, e.g. knowledge-based perspective, social network theory and co-opetition strategy, are chosen and elaborated on in this chapter.

Chapters 5 to 8 present the research methodology and the results of the empirical findings. Chapter 5 examines aspects of the research methodology behind this thesis. In

this chapter, a theoretical conceptual framework is developed by exploring the relationship between key concepts and theories on the topic. After then discussing methodological issues of research, i.e. the philosophy, logic and research method, an appropriate research method for this study is justified and chosen. Finally, an analytical process of this study is designed, and the quality of the chosen method is diagnosed through assessment of the validity and reliability of the method.

In Chapter 6, an explorative case study is performed in order to identify whether the patterns which are assumed in the theoretical model substantially occur in the maritime logistic field. This chapter introduces the explorative case study design, briefs the process of the case study conducted in this study, and summarises the findings of the interview which targets at Korean maritime operators. Chapter 7 empirically investigate the proposed relationships by using two rounds of the Delphi survey method, implemented through direct participation of a panel of experts in the Korean maritime industry. In the first part of this chapter, the Delphi survey method is generally designed. Subsequently, a questionnaire for the survey is developed. Finally, the empirical findings from the answers of the survey are discussed. In Chapter 8, the thesis is summarised, and three propositions grounded on the empirical findings are suggested. Academic and strategic implications of this research are also discussed. Finally, this chapter discusses its contributions and limitations and gives directions for future research.

CHAPTER 2 GLOBAL LOGISTICS

2.1 INTRODUCTION

Logistics has become a significant topic in global business management, and is seen as a way to enhance firms' outcomes (Grant, Lambert, Stock and Ellram, 2006). Since the early 1960s, the importance of logistics has dramatically increased, as evidenced by the amount of attention paid to it by both practitioners and academics. The increasing interest in logistics is due in large part to the internal and external environmental factors affecting firms such as globalisation, changing customer demands, advances in technology, and deregulation. Firms which experience environmental challenges begin to recognise that to focus only on producing proper goods with a low price leads to a limitation in their competitive edge and it is necessary to seek a new way of gaining competitiveness. As part of these renewed efforts, firms adopt various managerial practices. Yet most importantly, the effective management of logistics is well accepted as a crucial source of firms' competitive advantage.

Logistics refers to the process of managing the flow of goods and information from the origin to final consumption (Coyle, Bardi and Novack, 1996). Numerous studies highlight how the logistics process helps firms gain a cost- and service quality-based advantage. Consequently, logistics may be beneficial for firms' global competitiveness.

With the above information in mind, this chapter reviews the literature that underpins the importance of the role of logistics in global business. The concept, goal and advantages of logistics and global logistics are examined through an extant body of relevant literature. Changing global business environments are described in order to understand the background of why managers recognise the critical role of logistics in their business. In the last section, the role of maritime transportation in a logistics integration system is introduced.

2.2 LOGISTICS IN CONCEPT

2.2.1 Definition of Logistics

Initially, logistics is viewed simply, as first and foremost the physical distribution brought about by the focus on transportation and warehousing. Yet logistics gradually evolves into a more broadened scope, one that spans from the point of origin to the point of final customers (Novack, Langley and Rinehart, 1995). For example, logistics is often regarded as the whole process in managing the flow of goods, services and information from raw materials to final consumers (Caputo and Mininnon, 1996; Stock, Gresis and Kasarda, 1999; Baudin, 2004).

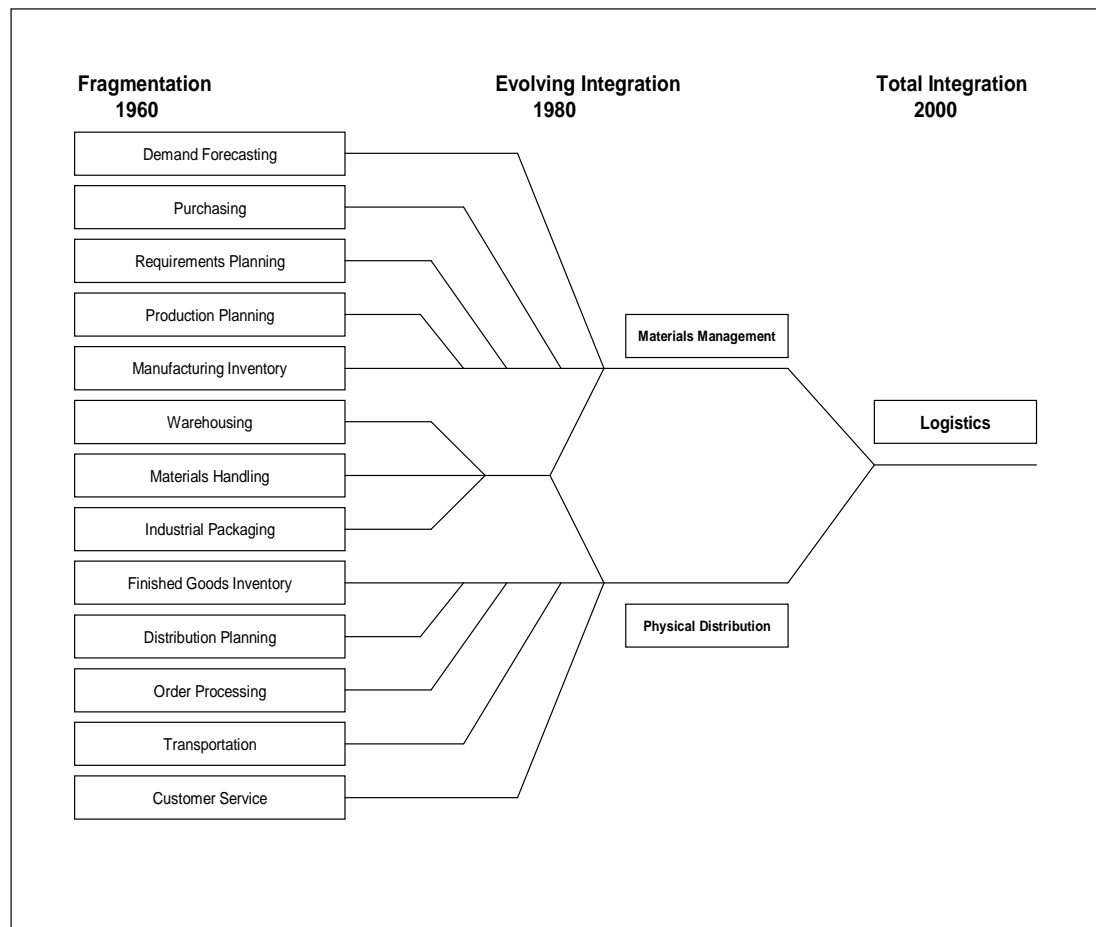
The definition by the Council of Supply Chain Management Professionals (CSCMP) (2007) is one of the most popular definitions of logistics from that focus:

“Logistics is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers’ requirements.”

This definition also encompasses all the relevant activities of the flow of goods from the origin to ultimate destination, including transportation, warehousing, purchasing, distribution, etc.

Another attempt, which is based on evolutionary perspective, is made to clarify the logistics concept. Coyle et al. (1996) highlight that logistics primarily evolves from physical product movement, depending upon the change of managerial focus. The evolution process is illustrated in Figure 2.1. In the 1960s and 1970s, as international competition among firms became intense, firms which had been mainly concerned about the manufacturing of goods (i.e. material management-inbound side) began to pay keen attention to the flow of finished goods (i.e. physical distribution-outbound side), in order to survive the tough competition. In the 1980s when firms experienced rapid and revolutionary change in their business, firms recognised that further and more comprehensive integration of all the managerial functions (i.e. both material management and physical distribution) could bring them higher competence and profits. Such recognition led to the advent of the logistics concept (Coyle et al., 1996).

Figure 2. 1 The Logistics Evolution



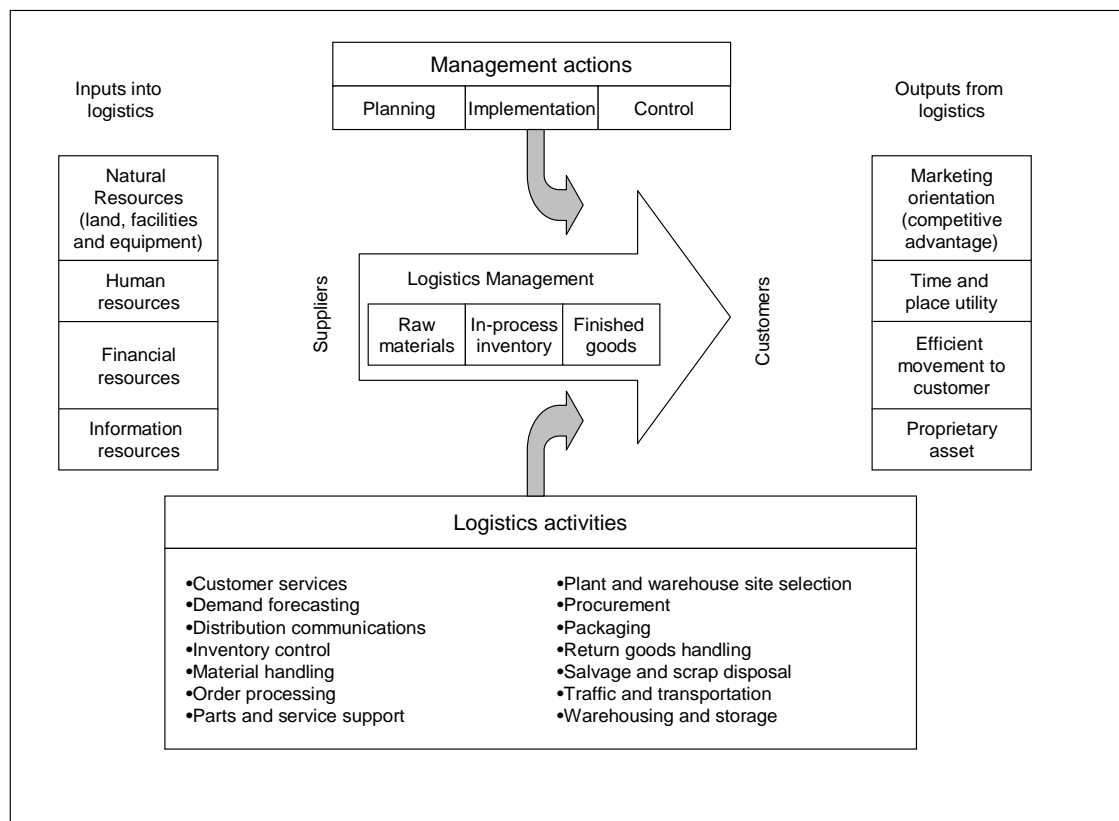
Source: Coyle et al. (1996, p. 7).

In contrast to the previous definitions which focus more on the external (e.g. inbound- and outbound-) flow of goods, logistics from the evolutionary perspective encompasses both internal operations (e.g. material management) and external physical distribution, and covers an integrated system for decision making about transportation, inventory levels, warehousing space, materials handling systems, packaging, and other related activities (Coyle et al., 1996). In this sense, it reflects on the integration of all the relevant logistics functions.

In line with the integrated movement in defining logistics, Grant et al. (2006) identify integrated components in logistics management. Figure 2.2 shows the brief process and related activities of logistics. The main frame of logistics management is to transform raw materials provided by suppliers into finished goods, which will then be delivered to final customers. Through the process, inputs of all kinds of organisational resources are used to create logistical outputs. Managerial actions (e.g. planning, implementation and

control, and the related logistics activities) support the logistics management, and consequently, the whole procedure contributes to a firm's competitive advantage, time and place utility, and efficient movement to the customer and proprietary asset. When all the functions in the process work together as a single system, the competitive effectiveness would increase.

Figure 2. 2 Components of Logistics Management



Source: Grant et al. (2006, p. 4).

Meanwhile, there are several others who make an effort to define the logistics concept based on their own views. Christopher (2005) employs a marketing oriented approach, which highlights that logistics is a planning framework with marketing channels to create a single plan for the flow of products and information.

“Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organisation and its marketing channels in such a way that current and future profitability is maximised through the cost-effective fulfilment of orders.” (p. 4)

Novack et al. (1995) address the mission of logistics and its usefulness by defining it as follows;

“Logistics involves the creation of time, place, quantity, form, and possession utilities within and among firms and individuals through strategic management, infrastructure management, and resource management, with the goal of creating products/services that satisfy customers through the attainment of value.” (p. 28)

Using this definition, Novack et al. (1995) regard the main goal of logistics as satisfying customers through successfully managing the logistics processes. The indicators of customer satisfaction may include fast deliveries, low costs, little wastage, quick response, high productivity, low stocks, no damage, few mistakes, etc.

From the above understanding, the following three elements could encompass the key features of logistics concepts:

- Logistics includes both material management and physical distribution of goods or services and related information;
- Logistics management is an integrating function, which coordinates and optimises all operational activities; and
- The main goal of logistics is customer satisfaction through an efficient flow of goods, services and information from the point of origin to the point of final consumers.

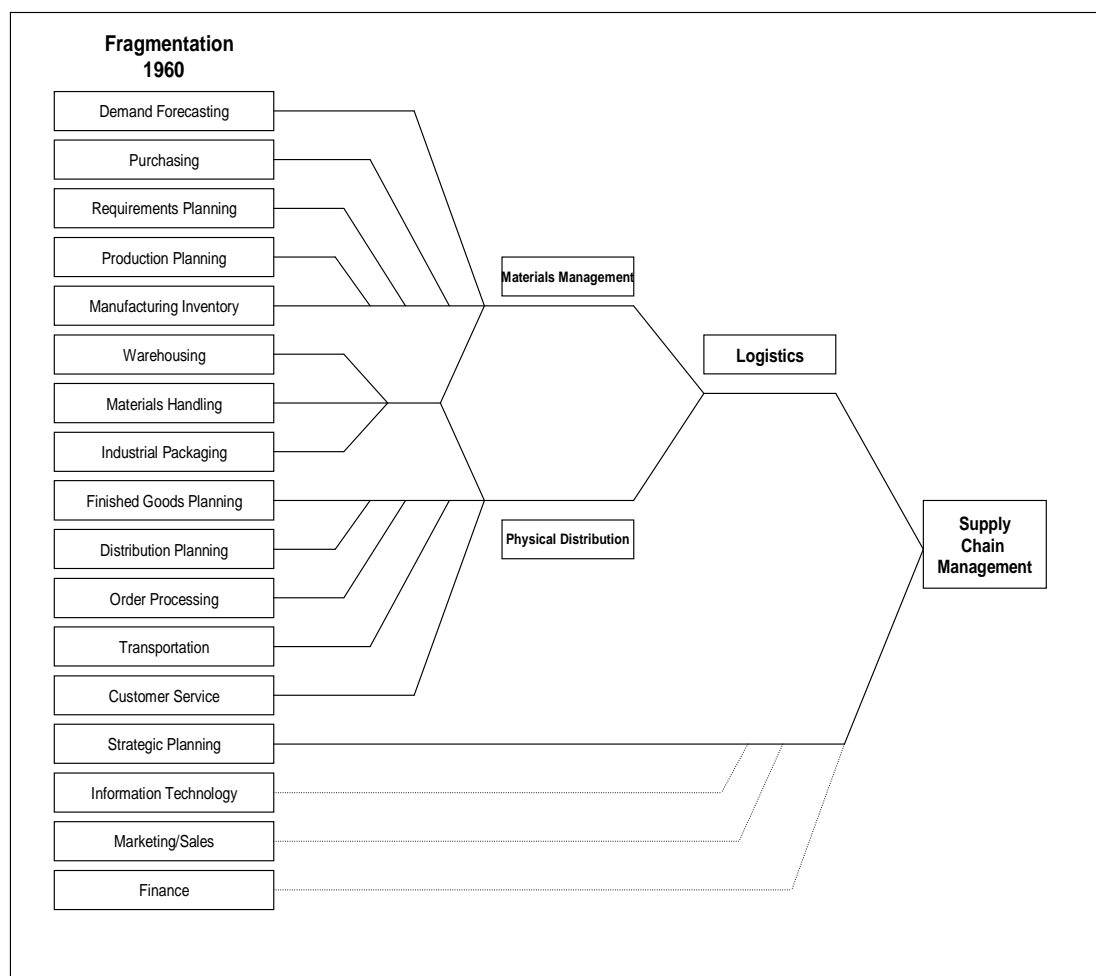
Despite the distinctive common features of logistics, the concept is sometimes used interchangeably with supply chain management. The following section attempts to clarify the differences of logistics and supply chain management.

2.2.2 Definition of Supply Chain Management

Supply chain management is often confused with the logistics concept. There are several attempts to investigate differences between the two concepts.

According to an evolutionary perspective of the concepts (Coyle et al., 2000), supply chain management is evolved from logistics and expands (i) the functional scope by integrating the logistics functions (e.g. the material management and physical distribution) and additional activities of strategic planning, information technology, marketing/sales and finance, and (ii) the organisational scope from the point of origin to the point of consumption. Figure 2.3 is an extended version of Figure 2.1 to accommodate this definition.

Figure 2. 3 Logistics Evolution to Supply Chain Management



Source: Coyle et al. (2000, p. 9).

Consistent with Coyle et al. (2000)'s organisational expansion in defining the concept, many other academics shift their view from a single organisation in the context of logistics to multiple relationships among organisations (e.g. suppliers, customers, and distributors) in a supply chain management context. For example, CSCMP (2007)

suggests that supply chain management spans the scope of activities to all channel parties which are related to supply and demand operations:

“Supply chain management encompasses the management of all logistics activities, as well as manufacturing, design, finance, and information technology. It also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, and the third party management within and across companies. In essence, supply chain management integrates supply and demand management within and across companies” (CSCMP, 2007).

“Supply chain management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance, and information technology” (CSCMP, 2007).

Grant et al. (2006) also address the gap in approaching the two concepts. They point out that “while logistics management is about optimising the flows within the firm, supply chain management seeks to achieve trust and coordination between processes of all firms in the supply chain” (Grant et al., 2006, p.15). Thus, the key determinant of firms’ competitive advantage in supply chain management stems from inter-organisational coordination to realise the common benefits, which may represent a more strategic nature.

Christopher (2005) also extends the range of logistics into the inter-organisational coordination among entities in the chain network (i.e. suppliers and customers):

“Supply chain management is a network of connected and interdependent organisations mutually and co-operatively working together to control, manage, and improve the flow of materials and information from suppliers to end users” (p. 85).

From the above definitions, three dimensions differentiating supply chain management from logistics can be identified: (i) scope of managerial function, (ii) approaching view and (iii) focusing point. They are summarised in Table 2.1.

Table 2. 1 Comparison between Logistics and Supply Chain Management

Category	Logistics	Supply Chain Management	References
Scope of managerial functions	<ul style="list-style-type: none"> Logistics encompasses the whole of the managerial activities which relate to material management and physical flow of goods and information. 	<ul style="list-style-type: none"> Supply chain management integrates broader managerial activities i.e. marketing and sales, information technology and finance. 	Coyle et al. (1996; 2000)
Approaching view	<ul style="list-style-type: none"> Logistics involves the flow of a firm between the point of origin and the point of consumption. Logistics is primarily concerned with optimising flows <i>within the organisation</i>. 	<ul style="list-style-type: none"> Supply chain management focuses on the multiple relationships of a network among all the channel partners, i.e. suppliers, intermediaries, third party service providers and customers. Supply chain management relates to the external integration <i>among organisations</i>. 	Coyle et al. (1996; 2000) Baudin (2004) Christopher (2005) Grant et al. (2006) CSCMP (2007)
Focusing point	<ul style="list-style-type: none"> Logistics focuses on the efficient flow of goods or service and information of an organisation by optimising all the process. 	<ul style="list-style-type: none"> Supply chain management seeks to achieve co-ordination between the processes of other entities in the network as well as the single logistic plan for the flow of product and information. 	Coyle et al. (1996; 2000) Christopher (2005) Grant et al. (2006)

Source: Compiled from various sources.

Firstly, in relation to the scope of managerial functions, logistics involves the primary functions from the origin of the goods to the final destination (e.g. material management and physical distribution), but supply chain management incorporates more broadened managerial activities (e.g. strategic planning, information technology, marketing, and finance) in order to support the effective functions of logistics (Coyle et al., 1996).

Secondly, logistics is basically interested in an efficient flow *within a single organisation*, but supply chain management emphasises external integration *among organisations* by prolonging the organisational scope of logistics (Christopher, 2005).

In the context of the focusing points, logistics stresses the full optimisation of applicable activities for the smooth and efficient flow of goods or services and information. Supply chain management pursues not only the efficient flow, but also the effective coordination across channel organisations in order to maximise benefits of all the entities.

Recognising such differences, some arguments have been made that supply chain management is a wider and broader concept. However, the discussion is beyond the scope of this study, as the current study is interested in the role of the maritime transport operators for *the efficient and effective flow of goods and information within an organisation* rather than effective coordination or trust among other channel components. Therefore, the logistics concept would be more suitable to the objective of this study than supply chain management. In the next section, the growing importance of logistics in today's changing business environment will be examined, along with the key activities of logistics and its advantages.

2.2.3 Changing Business Environment

In the decades after World War II, firms rapidly grew by stretching their business scope and scale. This led to an increase in complexity in managing the expanded product lines and their efficient distribution. During this period, firms also faced environmental challenges in their businesses, challenges which largely affected firms' managerial decisions and organisation behaviours (Dornier, Ernst, Fender and Kounelis, 1998; Gourdin, 2001). The changing environment stimulated firms to put more emphasis on logistics functions. This section identifies major features of the environmental challenges as driving forces in the development of logistics: changing customer demands, advances in information technology, deregulation and globalisation.

• Changing Customer Demands

Knowing what customers demand of firms and determining why the customers choose the product are essential elements for firms to enhance their business performance. Today's customer needs are harder to please, as they demand more complicated goods and service that offers a lower price, high quality, and the best delivery service in a highly reliable, flexible and timely manner. Moreover, due to the rapid development of information technology, customers become more knowledgeable about a firm's managerial process and can easily compare products with other competitive items. This then causes an increase in the customer's bargaining power.

In order to fulfil the customer demands, firms need to make flexible decisions not just on manufacturing but also on worldwide distribution with low cost mechanism (Vogt,

Pienaar and Wit, 2002). Thus, business managers perceive that focusing solely on the price and/or quality of products no longer satisfies their customers, and that this alone cannot bring them differentiated competitiveness. In addition, they need to manage effective distribution of products, service and relevant information. In this respect, managing logistics functions becomes more decisive to meet the complex requirements.

- **Advances in Technology**

Over the last decade, information technology has made spectacular progress. It has facilitated innovations in overall managerial activities and allowed firms to operate more efficiently, as well as improve the quality of their goods. In particular, information technology with powerful computer equipment has played a pivotal role in distribution operation management by enabling the process to be automated, thereby allowing firms to control inventory costs and equipment scheduling more easily (Coyle, Bardi and Novack, 2000).

For instance, an enterprise resource planning (ERP) system makes possible firm-wide distribution planning everywhere (Zyslra, 2006). Radio-frequency Identification tags (RFID) enable firms to trace and be informed of the locations of every item in a firm. The process of truck routing and scheduling is also highly improved by the use of high-tech computer equipment (Baudin, 2004; Coyle et al., 2000; Zyslra, 2006).

Another popular example is the use of bar codes and electronic data interchange (EDI), which is beneficial in enhancing both the speed and accuracy of information (Dornier et al., 1998). If a customer orders some products, the order is transmitted via the EDI to the supplier's computer, which then guides the required amount of the item. Details of production, billing and relevant documents are timely and automatically proceeded and revised via the EDI (Gourdin, 2001). An electronic point of sale (EPOS) system also enables firms to examine customers' daily consumption pattern and to identify quantities of restocking (Jeannet and Hennessey, 1998; Zyslra, 2006).

Development of the computerised retail systems leads to more efficient movement of cargoes, to more accurate and reliable pickups and deliveries, and to broader distribution planning and optimisation in scope and size (Zyslra, 2006).

- **Deregulation**

Deregulation is referred to as the removal or weakening of legal restrictions in an industry (Bell and Cloke, 1990). For example, those who favour deregulation are in favour of opening the telecommunications market in EU and Asia, opening Japanese financial markets, and eliminating international trade barriers worldwide (e.g. the creation European Union (EU), the North American Free Trade Agreement (NAFTA) and the opening up of Eastern Europe). Deregulation permits a more liberal operation of firms and creates new opportunities to enter new markets by lessening legislative controls in the markets. But sometimes it may generate some threats to trigger fiercer international competition (Jeannet and Hennessey, 1998).

Meanwhile, deregulation affects firms' distribution process. For example, the deregulation of the transportation marketplace, e.g. air, motor, and rail carriers in the 1980s U.S., accelerated revolutionary changes in the U.S. transportation system. It contributed to cost reduction and service quality improvement in the transportation sector, which then result in a lowering of overall managerial costs (Dornier et al., 1998).

There are other deregulatory examples in the transport sector in the UK. The Transport Act 1962, which contained the abolishment of the price control of rail services permitted the adoption of market-based pricing. The Transport Act 1968 and 1985, and deregulation in the bus industry in 1980, promoted the liberalisation of the road freight transport system (Bell and Cloke, 1990). The privatisation of rail business in the UK has steadily accelerated since the 1980's (Hilmola and Szekely, 2006). During this same period, the UK government deregulated domestic airfares and extended this deregulation into many air routes across European countries such as The Netherlands, Germany, Belgium and Ireland (Dearden, 1994).

The above cases indicate that deregulation may affect managerial behaviours by enabling firms to access new markets more easily, and also to use various distribution facilities more freely even in foreign countries. Deregulation may also be beneficial in reducing firms' transportation costs and improving their managerial productivity.

- **Globalised Businesses**

The most prominent trend over the last decade has been firms' globalisation. Globalisation in business is referred to as "the shift towards a more integrated and interdependent world economy" (Hill, 2001, p. 6).

The globalisation of business has a tremendous impact on firms' operation in various aspects. Firms who are not satisfied merely through gaining high revenue from the domestic market begin to span their business overseas, and to transfer technologies and the best managerial practices across international borders. By doing this, they could earn higher profits from the newly created global markets and customers. Firms can also, through globalisation, seize another good chance to purchase raw materials or goods of a more favourable condition and quality from global suppliers. This in turn may contribute to firms' economic progress and performance (Mentzer, Meyers and Stank, 2007).

As globalisation increases, many firms begin to recognise the strategic importance of managing the globally expanded flow of goods and services, since the expanded market requires more complicated and dynamic managerial decisions on purchasing, procurement, storage, distribution and so on.

2.2.4 Growing Importance of Logistics

Despite numerous benefits from the environmental challenges, the changes may also generate a great deal of managerial complexity and risk. In terms of business costs, even though firms can buy cheaper raw materials or labour in global markets, the globalisation may drive an excessive rise in distribution costs due to the geographically prolonged delivery structure. And a rise in energy costs around the world has also contributed to the burden on business costs. In addition, international customers have asked for improved operation and service, and such demands have accelerated the more intensive world-wide competition in controlling costs and quality.

Meanwhile, the globally linked operations need to be managed in the most efficient and effective ways possible. The frequency of order and shipping rates increase, quantities per order are reduced, and outbound transportation systems become more complex (Mentzer et al., 2007). Even with advances in information technology, it is still difficult to operate effectively in a global market where business flows become far longer and more complicated.

In the multiplex circumstances, managers realise that logistics is a major cost driver, and they therefore need to seek new ways of reorganising, adapting, and optimising the flow of goods and service (Waters, 2003). The traditional warehousing, materials handling, inventory, packaging, transport, and customer service for distribution are all required to be managed in a cheaper and more customised way in order to fully leverage global opportunities (Grant et al., 2006; Zylstra, 2006).

In summary, the denoted changes have boosted managerial attention on logistics. The challenging demands require managers to plan and manage the flows of physical goods and information in a more strategic and integrated way. In this regard, the key practices which constitute the logistics process should be identified. Key activities of logistics will be discussed in the following section.

2.2.5 Key Activities of Logistics

Key activities in logistics may consist of: demand forecasting and planning, purchasing, inventory control, warehouse management and material handling, transportation, recycling, waste disposal and returns. Table 2.2 summarises the activities.

Table 2. 2 Key Logistics functions and Activities

Logistics function	Activities	References
Demand forecasting and planning	Forecast of production requirements, pricing, promotion, place, competition, etc.	Grant et al. (2006)
Purchasing	Vendor selection, order processing, order follow-up	Kasilingam (1998) Waters (2003)
Inventory control	Order quantity, ordering frequency, inventory valuation, inventory disposal	Kasilingam (1998) Vogt et al. (2002)
Warehouse management	Storage of products from raw materials to finished goods, Warehouse location, capacity, design, etc.	Waters (2003) Grant et al. (2006)
Material handling	A departure bay/dock, moving goods around, information system for recording the location of goods, arrivals/departures of goods and other relevant information	Waters (2003) Grant et al. (2006)
Transportation	Fleet sizing, routing and scheduling, crew planning, hub or break-bulk terminal location, mode and carrier selection	Kasilingam (1998)
Recycling, waste disposal and returns	Handling, storage and carriage of reused or recycled items, flexible goods return policies	Vogt et al. (2002)

Source: Compiled from various sources.

- **Demand Forecasting and Planning**

Demand forecasting and planning of production requirements, pricing, promotion and competition are essentially needed in many parts of managerial activities (Grant et al., 2006). The decisions made as a result of demand forecasting and planning may greatly involve the logistics flow of goods and services. The accurate forecasting of the type and quantity of purchasing and producing, level of inventory and customer needs may have a great impact on the time and cost of logistics. Thus, demand forecasting and planning may be one of the most important logistics activities.

- **Purchasing or Procurement**

Purchasing or procurement relates to the acquisition of goods, services and other materials. It is important for firms to use materials on time, and directly affects transportation and inventory costs since they are influenced by the geographic location of raw materials or intermediate goods purchased. Therefore, logistics managers have to make important decisions on selecting the most suitable vendors, determining the amount and quality of goods and confirming an accurate supply of materials (Kasilingam, 1998; Waters, 2003).

- **Inventory Management**

Inventory management involves the amount, frequency and time of order processing, size and location of warehouse for storage, etc. (Kasilingam, 1998). Firms need to hold their inventory at minimum levels in order to avoid high logistics costs of storage and transportation (Vogt et al., 2002).

- **Warehouse Management**

Warehouse management relates to the storage of goods (e.g. raw materials, component part, goods in process and finished goods), and it involves many parts of the whole logistics process such as managing the space for storage, labelling and assembling materials, sorting goods in process, and holding stocks (Waters, 2003; Grant et al., 2006). Thus, the warehousing system may play a crucial role in maintaining the optimal flow of the goods.

- **Material Handling**

Material handling broadly encompasses the movement and operation of goods: receiving goods from suppliers, loading and unloading goods to/from delivery equipment, moving goods to warehouses, picking and packaging goods, and controlling

all other related systems (Waters, 2003; Grant et al., 2006). Material handling should be well managed since it also directly affects the speed and costs of the smooth flow of goods.

- **Transportation**

A transportation system connects all the entities in the logistics (e.g. customers, suppliers, plants, warehouses and other channels) by moving goods around them. A transport system provides firms with numerous possibilities of reducing the time of transit/delivery, cutting down logistics costs and minimising delay, damage and losses.

The transportation system consists of two parts of inbound and outbound movement. The inbound movement relates to a movement from the raw materials or parts to plants or through warehouses. The outbound movement deals with a linkage of finished goods or components from plants to customers. Selecting efficient transportation modes is fundamental to the efficient implementation of the whole logistics process (Kasilingam, 1998).

- **Recycling, Waste Disposal and Returns**

Managerial decisions on placing waste become a critical issue. Waste is often recycled; otherwise it must be properly disposed. Goods that are returned due to defect, or are returned as result of a mistaken purchase may generate extra high costs, and the process may affect firms' costs and time and the moral responsibility of managers. The extent to how much firms can promise to offer flexible and reliable return policies to their customers also has a great impact on customer satisfaction (Vogt et al., 2002). Therefore, the processes of recycling, waste disposal and returns are also significant activities of logistics.

In recent years, the key logistics activities mentioned above are often scattered around different countries. Therefore, the effective management of these globally dispersed operations becomes more critical for today's firms. This brings attention to *global logistics*. The concept and related issues of global logistics are discussed in the next section.

2.3 GLOBAL LOGISTICS IN CONCEPT

2.3.1 Globalised Businesses

A number of firms participate in the globalisation of business in the forms of exports, international strategic alliances and joint ventures, and so on (Dornier et al., 1998). The dramatic increase of foreign direct investment (FDI) is a significant indicator of the rise in globalisation. A study of ‘Development and Globalisation: Facts and Figures from the United Nations Conference on Trade and Development (UNCTAD) (2008) reports that:

“Global foreign direct investment (FDI) flows have risen steadily over the past 30 years. In 2006, global FDI inflows rose for the third consecutive year to reach US\$1.306 trillion, close to the record level of US\$1.411 trillion reached in 2000. The growth of FDI occurred in all regions and was partly driven by increasing corporate profits worldwide and resulting higher stock prices that raise the value of cross-border mergers and acquisitions.” (p. 28).

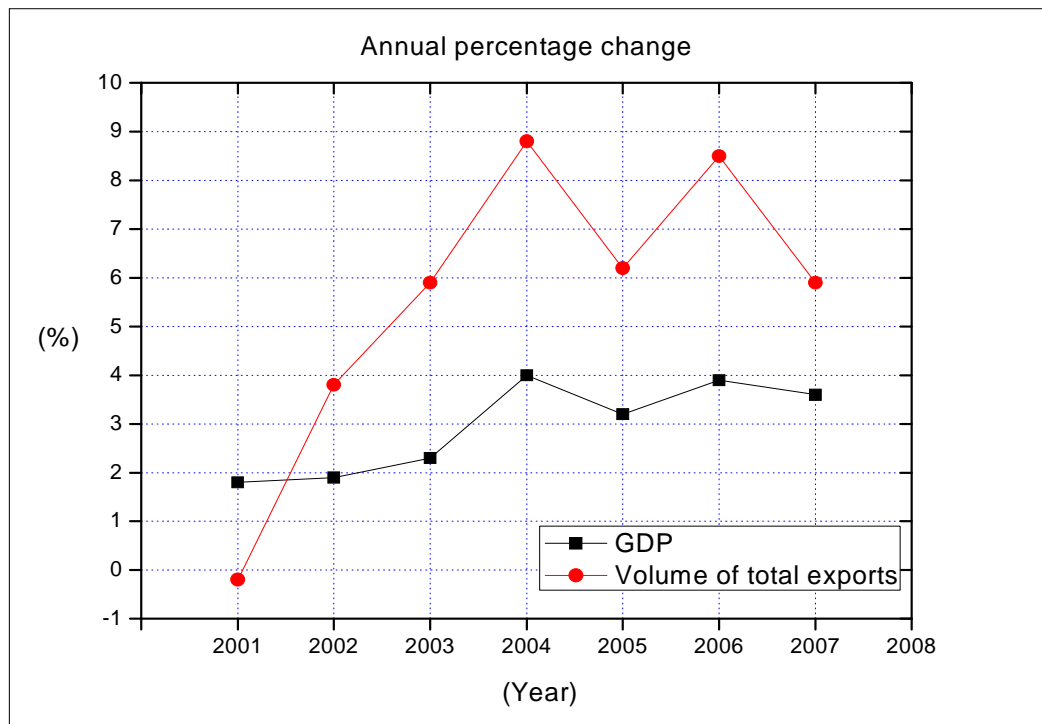
Key motivations for the global expansion of firms are (i) realising and maximising the value of firm-specific assets in the foreign market (i.e. ownership-specific advantage), (ii) making the best use of low cost advantages in the foreign market that offer lower wages and cheaper price of raw materials and social infra-structures (i.e. location-specific advantage) (Dunning, 1981), and (iii) accessing valuable local resources needed for the business (Chen and Chen, 1998). The trend brings an advent of a multinational firm. A multinational firm is referred to as “any business that has productive activities in two or more countries” (Hill, 2001, p. 19). Multinational firms play an important role in today’s global economy, where international trade continues to grow, the borders between countries become vague and various economies over the globe where countries are converging into fewer huge blocks.

Along with this movement, the World Trade Organisation (WTO) began to administer the system of international trade law in 1995, which accelerated the increase of international trade and global business. As a result, the volume of international trade and foreign direct investment dramatically increase (Gourdin, 2001).

Figure 2.4 shows the volume of world merchandise exports and gross domestic product during the period of 2001-2007. For this period, despite an exception in 2001, average exports volume generally increases by 2.7 percent. The world trade of merchandise expanded most in 2004. In relation to this issue, WTO (2008) also points out that:

“Despite the slight slowdown of trade growth since 2005 derived from a deceleration of import demand, mainly in the United States but also in Europe and Japan, trade remained strong in most developing countries such as Africa, the Middle East, the Commonwealth of Independent States (CIS), developing Asia and South and Central America.” (p. 1).

Figure 2. 4 Volume of World Merchandise Exports and World Gross Domestic Product 2001-2007



Source: Modified from WTO (2007, p. 1).

In the globalising market place, firms who continue to expand their operations into different parts of the globe and broaden their sourcing and marketing functions, have to satisfy the international customers by better utilising their resources and flexibly responding to the volatile environments where time-based competition becomes critical (Dennis and Michael, 2000; Christopher, 2005). Firms also need to manage global logistics processes whose flows are more prolonged, environmental conditions are

generally less stable, and the geographical scope is much broader than for domestic logistics (Wood, Barone, Murphy and Wardlow, 2002). Thus, firms are required to make complex, but strategically significant decisions on the way of coordinating the logistics activities which are globally dispersed (Gourdin, 2001). In this respect, global logistics becomes a critical issue.

2.3.2 Global Logistics

Having understood the increasing attention on managing logistics internationally, this section identifies the definition of global logistics and its importance to business management.

Sheu (2004) defines global logistics as follows:

“the extension of domestic business logistics in the geographic domain, as some of the corresponding logistic functions, e.g., physical distribution and inventory, are executed overseas.” (p. 39).

Wood et al. (2002) define international logistics as “goods transactions involving parties in two or more nations” (p. 10), and note that “international logistics involves movements that cross borders, and these movements are considerably more complex than domestic ones” (p. 246). For example, goods should be loaded to ships or flights moving through ports or airports, and such a process may be much more time consuming, and entail a higher business cost. Additional complicated matters such as time differences across the world and documentations with different languages, can also take place (Wood et al., 2002).

Gourdin (2001) states that global logistics is related to “how to manage the network of far-flung overseas activities as a single, effective unit, and international firms need to search for ways to convert worldwide production, marketing, research and development, and financial presence into a competitive advantage” (p. 14).

The existing studies identify the following distinguishable features of global logistics: (i) the geographical expansion of domestic activities of logistics into overseas, and (ii) the existence of more complex and uncertain factors derived from the expansion of its geographical scope (Gourdin, 2001; Sheu, 2004). In this sense, this study defines global

logistics as *the whole activities which involve logistics flows in two or more nations across the globe*.

Multinational firms should consider all the factors occurring in both the local and global market, thus they may have a lot of difficulties in making decisions in global logistics (Gourdin, 2001). For example, multiple languages, different cultures, various channel members, different currency, and different regulations, can be serious barriers to effectively coordinate the logistics process. Cultural difference, in particular, has been recognised as one of the most significant and important factors in successfully managing global logistics activities. This is due to the fact that the cultural or historical gap between countries may affect the general social systems of a nation, such as the given country's economic, legal and political spheres (Thomas, 2008). Globally fragmented activities of logistics which are difficult to coordinate, may prevent each activity from functioning correctly, and restrain firms from controlling the quality of the logistics functions (Nagurney and Matsypura, 2005).

Although it is much more complex and complicated than in domestic markets, it can give firms a new opportunity to achieve logistical advantages of reducing cost/time and improving service qualities by *effectively integrating* all the logistics functions and promptly fulfilling the various needs of international customers (Christopher, 2005). In this sense, the issue of integration in global logistics (Gourdin, 2001; David, Philip and Edith, 2000), which will be discussed in the following section, is of paramount importance. And a crucial role of transportation for effective integration of global logistics (i.e. maritime transportation in this thesis) will be introduced in the last section.

2.3.3 Global Logistics Integration

The divided activities of logistics are mutually linked, and every activity affects each other. If geographically scattered functions of logistics are not properly put together, they may come into conflict for their own aims, and generate a number of problems with the smooth flow of goods and services. For example, managers of warehousing may prefer to reduce the stock of materials as much as possible in order to reduce costs, but this may in turn cause a serious lack of the stock, and facilitate frequent ordering or unexpected deliveries. Consequently, the overall costs and processing time of logistics may increase (Waters, 2003). The logistics integration, in this sense, becomes a decisive

factor in the success of global logistics (Caputo and Minnon, 1996). Table 2.3 shows the concept, goal and managerial benefits of logistics integration.

Integration is referred to as how individual components work together as a single unit in a co-operative manner to achieve their common goals (O’Leary-Kelly and Flores, 2002). Logistics integration would be reflected by the extent to which the divided activities of logistics (e.g. parties in both the upstream and downstream of a logistics system) are coordinated and worked together as a single function.

Table 2. 3 Concept, Goal and Benefits of Logistics Integration

	Logistics Integration	References
Concept	The extent to which divided activities of logistics worked together as a single function	O’Leary-Kelly and Flores (2002).
Goal	To satisfy customers by offering efficient and effective flow of goods and service	Waters (1999).
Benefits	To reduce business costs To reduce lead time of logistics process To enhance service effectiveness To improve customer satisfaction	Bowersox (1978); Narasimhan and Jayaram (1998); Vickery et al. (2003); and Chin et al. (2004).

Source: Compiled from various sources.

There has been an attempt to explain a process of logistics integration and its managerial advantages. Hines (1999) introduces the ‘integrated logistics value pipeline’, as illustrated in Figure 2.5. This model is built on Porter (1985)’s value chain model, which disaggregates a firm’s managerial activities into several specific functions in terms of primary and secondary categories to investigate a source of the firm’s value creation. In this model, there is one large flow of logistics from raw materials to the consumer. Value, which is accessed by customers, could be created along every logistics function or particular channels. But the main point of the value creation in Hines’s model (1999) is that all the primary and secondary functions should be processed as a single team by eliminating barriers impeding the partnership or teamwork along the pipe line (Hines, 1993).

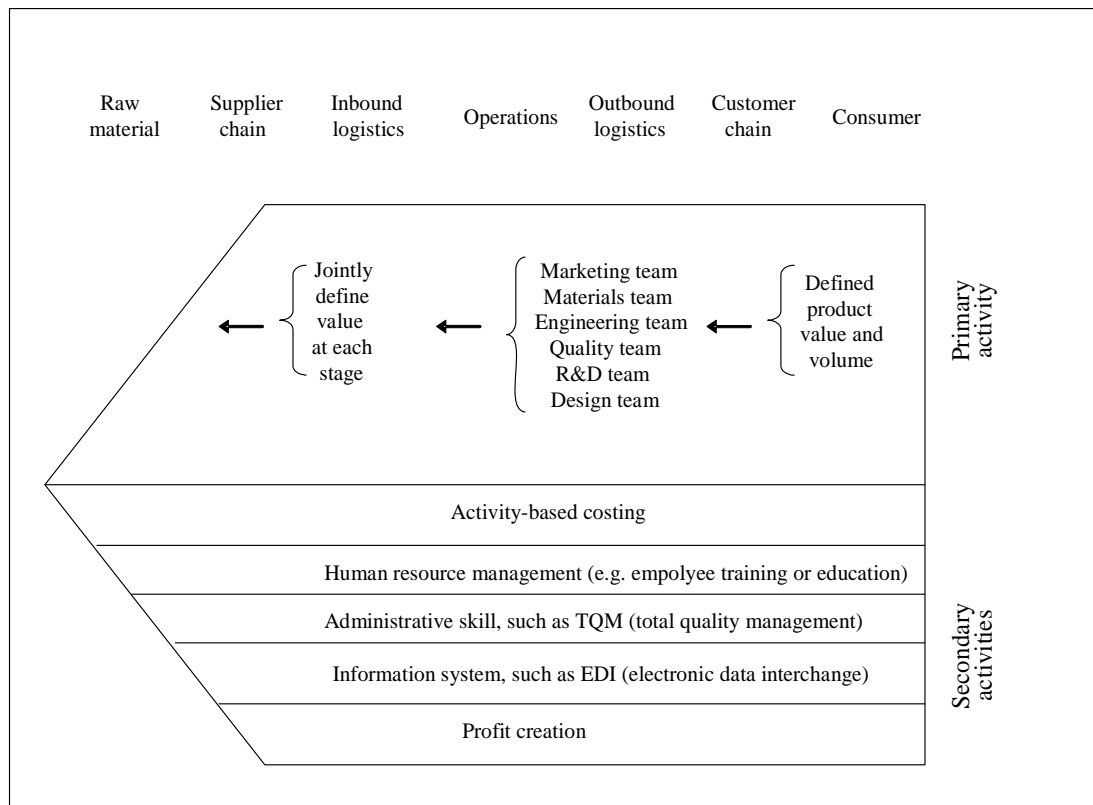
The ultimate goal of logistics integration is to satisfy customers by offering efficient and effective flow of goods and service (Novack et al., 1995). Well connected and integrated logistics functions make it easier for the members to share new information

and respond quickly to requirements of other functions and develop a good partnership with each other (Waters, 1999).

Waters (1999, p.5) suggests significant benefits from the integration of the logistics. They include:

- eliminating duplication of effort, information, planning, etc.;
- eliminating operations that do not add value to the customer;
- improving efficiency and productivity to reduce costs;
- reducing stocks and response times;
- having actual demand trigger replenishments along the chain;
- being more responsive to customers; and
- sharing information and links systems.

Figure 2. 5 The Integrated Logistics Value Pipeline



Source: Modified from Hines (1999, p. 55).

There is more evidence on the benefits of logistics integration: for example, (i) cost reduction and (ii) customer service/satisfaction improvement in global logistics. Bowersox (1978) suggests that an integrated system of logistics contributes to the creation of a cost-based advantage rather than a system which operates with separately optimised functional subsystems. Vickery, Jayaram, Droge and Calantone (2003) discover a positive effect of integrated logistics system on customer service and financial performance. Narasimhan and Jayaram (1998) support the notion that logistics integration has a positive impact on customer satisfaction.

Chin, Tummala, Leung and Tang (2004) also discuss the benefits from the integration in terms of cost- and customer satisfaction-based advantages. Global firms who succeed in the logistics integration can deliver products to customers at the required time, right place and reasonable price. Consequently, logistics integration contributes significantly to cost reduction and higher customer satisfaction.

The logistics integration requires maritime transport entities to handle cargoes in a much more flexible and efficient way and to work together in a co-operative manner in order to realise mutual benefits among firms in the integration system (O'Leary-Kelly and Flores, 2002). Maritime transportation, which is responsible for carrying and handling cargoes across the ocean, are forced to play a decisive role in achieving higher performance of the logistics integration system, by swiftly connecting world-wide dispersed transportation linkages between a consigner and a consignee (Huybrechts, Meersman, Van de Voorde, Van de Hooydonk, Verbeke and Winkelmans, 2002; Misztal, 2002). In this sense, maritime transportation is regarded as a strategically significant component of the logistics integration system. The next section discusses the importance of maritime transportation in effective global logistics flows.

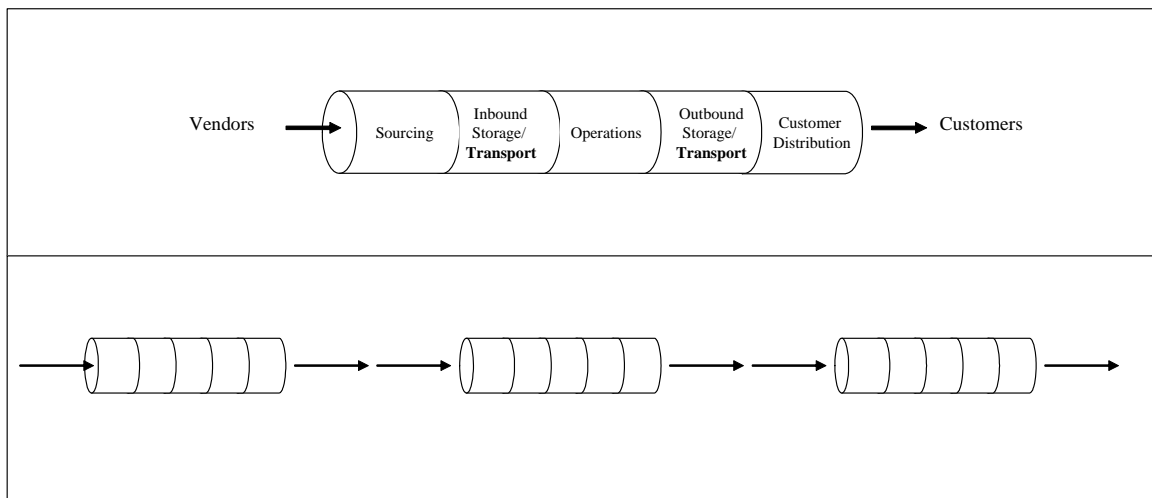
2.3.4 Maritime Transportation in Global Logistics

Maritime transportation is an essential part of logistics integration (Mason and Lalwani, 2004). The integral role of maritime transportation could be depicted as a pipeline where goods are flowing, which is depicted in Figure 2.6 (Kanflo, 1997). On the upper part of Figure 2.6, the key functions of logistics from vendors to customers (e.g. sourcing, inbound and outbound storage, transportation, operations and distribution) are inter-linked as one unit of a pipe, where goods move through. If one function in the pipe

has a problem, the whole flow of goods would fail to be smoothly processed. The bottom of the figure shows the flow of goods from raw material to final consumer. This part of the figure is linked with several pipes and integrated as one large system by extending the channel of one pipe.

Maritime transportation, as a part of transport in the pipe, is an intermediate channel in each pipe, and connects several components within or between the pipes by moving cargoes. If the maritime transport system is not well coordinated and integrated into the whole function; for example, in the case of extra high costs, delays and several accidents occurring; the flows of the pipe(s) may be affected by these problems. Therefore, maritime transportation is no longer a separate/independent entity pursuing its own benefits (Mason and Lalwani, 2004); rather, it should keep pace with other logistics elements by handling cargoes in a co-operative manner so as to realise mutual benefits among firms in the logistics (O’Leary-Kelly and Flores, 2002).

Figure 2. 6 Transportation in Global Logistics Integration



Source: Kanflo (1997, p. 171).

The integrated demand for maritime transport within the context of global logistics brings a new ‘*maritime logistics*’ concept, which regards the maritime transport system as a key systematic entity of the logistics integration (Panayudes, 2006). The concept, practice and role of maritime logistics will be described in more detail in the next chapter.

2.4 SUMMARY

This chapter reviews driving forces in the advent of logistics, along with the concept and practice of logistics. The importance of global logistics has been identified. The current chapter also examines that the effective integration of a global logistics system is essential in achieving firms' higher competitiveness and higher customer satisfaction as well as the improvement of logistical performance. The mechanism of logistics integration forces a maritime transport system to play the role of being a node of the whole flow of goods and information in the integration system. Such requirement has brought an advent of a new concept, i.e. maritime logistics. The details of this maritime logistics concept will be discussed in the next chapter.

CHAPTER 3 MARITIME LOGISTICS AND OPERATORS

3.1 INTRODUCTION

The logistics process achieves higher performance through excellence in the maritime transport system, which is itself achieved through swiftly connecting world-wide dispersed transportation linkages between a consigner and consignee (Huybrechts, Meersman, Van de Voorde, Van de Hooydonk, Verbeke and Winkelmanns, 2002; Misztal, 2002). Thus, maritime transportation is regarded as a strategically significant component of the logistics integration system. Such a view contributes to the advent of a ‘maritime logistics’ concept.

Maritime logistics is referred to as a process of planning, implementing and managing the movement of goods and information which are involved in the ocean carriage. As an integrated part of the logistics process, a maritime logistics system is required to accomplish the goal of the entire logistics system. Therefore, the value of maritime logistics is reflected in how well maritime operators can provide efficient and effective service for the smooth flow of logistics.

This chapter hereafter describes the role of maritime operators (e.g. port operators, shipping lines and freight forwarders) in maritime logistics; clarifies the strategic goal of the maritime operators; and elaborates the need for a new strategic direction for maritime operators to achieve this strategic goal.

3.2 MARITIME LOGISTICS

3.2.1 Definition of Maritime Logistics

Despite the fact that there have been a large number of attempts to investigate the convergent role between maritime transportation and global logistics (Lu, 2000; Heaver, Meersman, Moglia, and Van de Voorde, 2000; Notteboom and Winkelmanns, 2001; Robinson, 2002; Carbone and De Martino, 2003; Bichou and Gray, 2005), the term maritime logistics has not been clearly addressed. Panayides (2006) initially introduced

the concept of maritime logistics within the context of global supply chains, but the definition and other related attributes such as scope, process and characteristics of the concept have not been examined in his study. In this sense, this study establishes the definition of the maritime logistics concept, being based on the literatures of global logistics and maritime transportation.

As reviewed in the previous chapter, global logistics managers have made managerial efforts to realise better optimisation in logistics integration. For example, firms adopt the information system in order to freely exchange a great number of information between firms in logistics, and to connect all of the logistics activities in an efficient manner. Sometimes, in order to ensure agile and flexible moving of goods and cargoes, firms in logistics are required to offer additional logistics activities. Through these efforts, managers have recognised that if maritime transportation is not well inter-linked with other entities, or if it cannot cope with the logistical demands placed upon the system, it will become a bottleneck which interrupts the smooth flow of goods and information in the logistics flows.

These possible problems with the poor practice of maritime transportation have highlighted a significant need for maritime transportation to be well integrated in the entire logistics system. In the mean time, the effectively integrated maritime transportation, which performs a wider variety of logistical services and fosters the quicker door-to-door service, can create high logistical value. In this regard, maritime transportation is a systematic element in the global logistics integration system (Mason and Lalwani, 2004). As a result, the concept of ‘maritime logistics’ newly appears to imply a view that regards maritime transportation as an integrated component of the logistics flow (Panayides, 2006). Thus, the concept of maritime logistics should be defined from the definition of the logistics concept point of view.

As reviewed in Chapter 2, logistics is referred to as “the process of planning, implementing and managing the movement and storage of goods and the associated information from the point of origin to the point of consumption” (Rushton and Walker, 2007, p. 4). Maritime logistics is responsible for the managerial proceedings of systematically managing the ocean movement of goods and information in the most efficient and effective way in order to be successfully integrated into the logistics system. From such a point of view, this study defines maritime logistics as *the process*

of planning, implementing and managing the movement of goods and information which is involved in the ocean carriage.

Table 3. 1 Comparison of Maritime Logistics and Maritime Transportation

	Maritime Logistics	Maritime Transportation
Concept	The process of planning, implementing and managing the movement of goods and information which is involved in the ocean carriage.	The process of carrying and handling cargoes across the ocean.
Focusing Point	Maritime logistics is concerned with not only individual functions relating to sea transportation, but also an effective logistics flow as a systematic entity of the logistics integration system.	Maritime transportation emphasises individual functions relating to sea transportation. Each function pursues its own aims or competitiveness.
Managerial Scope	Sea transportation activities: e.g. contracting, shipping, sea voyage, moving cargo, and loading/unloading Additional logistics services: e.g. stripping/stuffing, storage, warehousing, offering a distribution centre, quality control, testing, assembly, packaging, repacking, repairing, inland connection, and re-use	Sea transportation activities: e.g. contracting, shipping, sea voyage, moving cargo, and loading/unloading
References	World Bank (2006); Panayides (2006); Lu (2000); Robinson (2002); Notteboom and Winkelmanns (2001); Carbone and De Martino (2003); Bichou and Gray (2005); Long (2003)	

Source: Compiled from various sources.

Table 3.1 summarises the comparison of maritime logistics and maritime transportation. Maritime logistics can be distinguished from maritime transportation in the focusing point. For example, while maritime transportation emphasises individual functions relating to sea transportation and pursues its own aims or competitiveness, maritime logistics is mainly concerned with an effective logistics flow as a systematic entity of the logistics integration system. By fulfilling the integrated logistical demands, maritime logistics operators could minimise business costs and maximise customer satisfaction. As a result, they can also improve their own competitiveness (Panayides, 2006).

As far as the scope of managerial functions are concerned, maritime logistics involves not only the activities relating to maritime transportation, e.g. contracting, shipping, sea voyage, moving cargo, loading/unloading, but also other logistics services, e.g.

stripping/stuffing, storage, warehousing, inventory management, offering a distribution centre, quality control, testing, assembly, packaging, repacking, repairing, inland connection, and re-use (World Bank, 2006). The key activities of maritime logistics are described in the following section.

3.2.2 Key Activities of Maritime Logistics

Maritime logistics consists of the following three key parts of maritime transportation: shipping, port operation, and freight forwarding. Table 3.2 summarises the key activities and supportive logistics functions of maritime logistics. The major function of the shipping system is moving the goods of shippers from one port to another. Shipping also provides other logistics services in order to successfully support the shipping and logistics flow, e.g. pickup service, delivery notification, a special handling service for customers who require that particular service, inbound/outbound bill of lading (B/L), container tracking and information, and intermodal service (Lu, 2000; Heaver et al., 2000; Robinson, 2002; Notteboom and Winkelmanns, 2001).

Table 3. 2 Key and Supportive Activities of Maritime Logistics

	Shipping	Port Operation	Freight Forwarding
Main Function	Moving cargoes between ports.	Shipping reception; Loading/unloading cargoes; Stevedoring; and Connecting to inland transportation.	Booking vessels; and Preparing for requisite documents for ocean carriage and trade, on behalf of shippers.
Supportive Logistics Activities	Documentation relating sea trade; Container tracking and information; and Intermodal service.	Warehousing Offering a distribution centre; Testing; Assembly; Repairing; and Inland connection.	Inventory management; Packaging; and Warehousing.
References	Lu (2000); Heaver et al. (2000) Robinson (2002); and Notteboom and Winkelmanns (2001).	Carbone and De Martino (2003); Bichou and Gray (2005); and Roh et al., (2007).	Murphy et al. (1992); Murphy and Daley (2001); Bernal et al. (2002); and Long (2003).

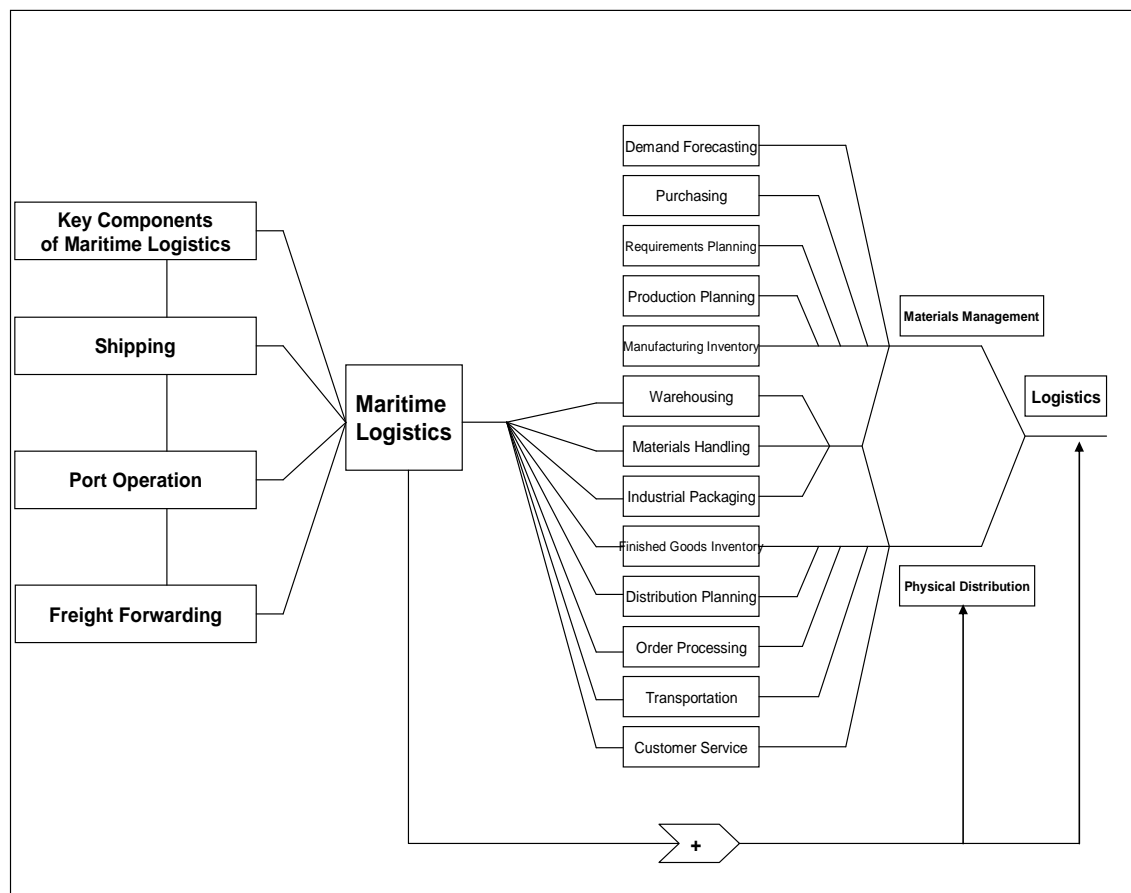
Source: Compiled from various sources.

The key function of port terminal operation is loading/offloading cargoes into/from a vessel, and ensuring that the cargoes are ready to be delivered to the final destination of consumer via inland transportation. In order to ensure that the cargoes can be passed smoothly and quickly to the next stage of the logistics system, port operation is also

involved in other logistics functions, e.g. warehousing, storage and packing, (Carbone and De Martino, 2003; Bichou and Gray, 2005; Roh, Lalwani and Naim, 2007).

Sometimes, a third inter-mediate party participates in the process of sea transportation in order to arrange the complex process of international trade. For example, freight forwarding operators book vessels on behalf of shippers, or prepare for requisite documents for ocean carriage, e.g. B/L, or other any documents required for customs clearance or insurance requirements. They also arrange other logistics services, e.g. inventory management, packing, and warehousing (Murphy, Daley and Dalenberg, 1992; Murphy and Daley, 2001; Long, 2003).

Figure 3. 1 Maritime Logistics in Logistics System



Source: Modified from Coyle et al. (2000, p. 9).

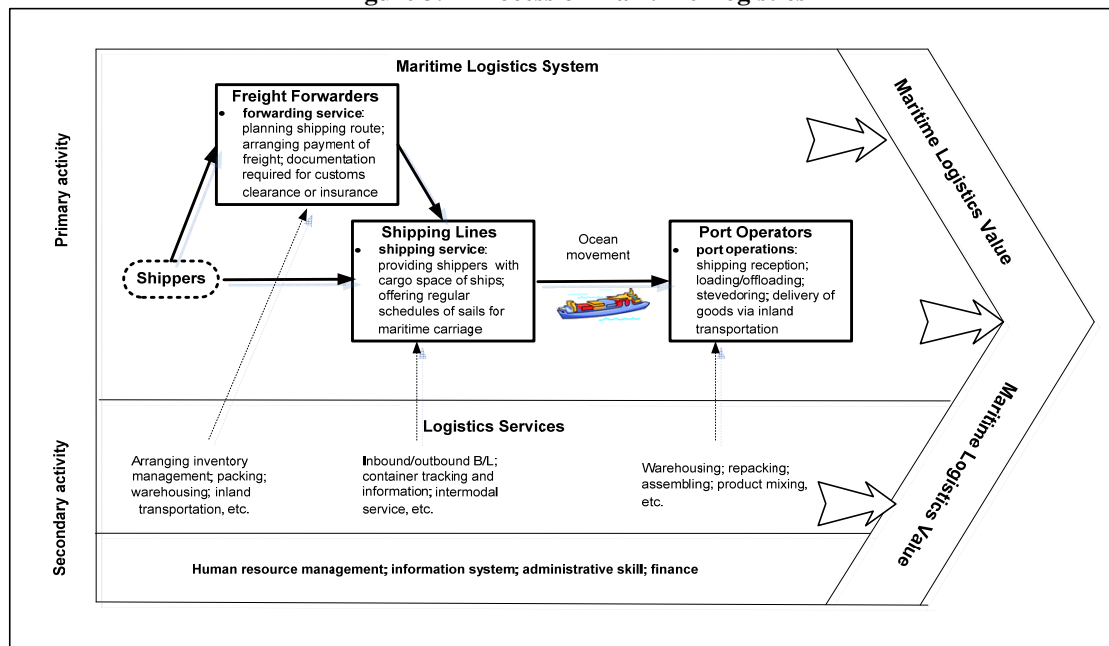
Figure 3.1 describes the relationship between maritime logistics and logistics. As indicated in Table 3.1, maritime logistics is involved in sea transportation service as well as additional logistics services, e.g. warehousing, material handling, industrial packaging, finished goods inventory, distribution planning, order processing,

transportation and customer service. Those additional logistics services are a major part of physical distribution activities, and therefore, the performance of maritime logistics activities may affect the performance of physical distribution management. The physical distribution is the central part of the entire logistics system. Consequently, successful management of maritime logistics may help to improve the effectiveness of both physical distribution and logistics management.

3.2.3 The Process of Maritime Logistics

The concept and key activities of maritime logistics have been identified in the previous section. Figure 3.2 shows the process of the maritime logistics system and its value creation. This model is built on Porter (1985)'s value chain model. The model disaggregates a maritime logistics system into primary and secondary activities. The primary activities consist of the major functions of the maritime operators (i.e. shipping, port operation and freight forwarding). The secondary activities are the activities which support the primary activities by helping them to be run more effectively. Additional logistics services of the maritime operators and their organisational capability (i.e. human resource management, information system, administrative skill and financial support) are essential in supporting the primary activities.

Figure 3. 2 Process of Maritime Logistics



Source: Drawn by the author.

The maritime operators of a maritime logistics system are inter-linked with each other as supplier or buyer. For example, shipping lines, who choose ports where their vessels will anchor, are the main customer of port operators; and freight forwarders, who do business for shippers, are the customers of shipping lines. The maritime logistics services can be offered when all of the operators in the system are well coordinated with each other as a single team. If the maritime logistics system can effectively prove that the services are *valuable* enough for their customers to willingly purchase the service, the maritime logistics value is created. The maritime logistics value can be improved when the maritime logistics system satisfies their customers with a higher quality of services. The highly valuable maritime logistics service finally leads to the high performance of individual operators and the entire logistics system. The concept of maritime logistics value and its effectiveness is specified in the following sections.

3.2.4 Maritime Logistics Value

“Value” is an abstract and intangible concept and is variously defined according to different views of managers (Rutner and Langley, 2000). Value is commonly understood by “the perceived worth in terms of the economic, technical, service and social benefits received by a customer firm in exchange for the price paid for a product offering” (Anderson and Narus, 1991, p. 99). Although firms provide differentiated goods or services, if customers are not satisfied with the goods or services, the goods or services may not be valuable.

Therefore, the maritime logistics value should reflect on how well the system fulfils customer needs. In this sense, this study defines *the maritime logistics value as the extent of how well the maritime logistics system responds to the customer demands through successfully managing the flow of goods, services and information in maritime logistics*. The value can be discussed from a customer’s point of view, or a service provider’s point of view; this study discusses from a firm’s (i.e. a service provider’s) point of view.

In order to examine the elements that constitute the maritime logistics value, firms should initially identify who the customers of maritime logistics system are, and what the customers demand of the system. Customers in maritime logistics may be primarily considered as the shippers who use the shipping and freight forwarding service, and the

shipping lines which are the customer of port operators. However, the maritime logistics service may also affect not only their direct customers but also all of the entities in an integrated logistics system, since they are inter-connected with each other and their operations are mutually affected by others' behaviour directly or indirectly. For instance, delays of shipping or carrying cargoes may cause serious problems, not only with processing other successive works but also with delivering goods on time to the final consumers. Such trouble may lead to serious dissatisfaction on the part of both the final consumers and other components in the entire logistics system. Therefore, the customer boundary of maritime logistics would not be limited only to the shippers or shipping lines. Rather, all the entities in an integrated logistics flow should be included as the customers of the maritime logistics system.

As far as the customer needs of maritime logistics system are concerned, the overall demands of all the customers in a logistics system should be considered. As stated in Chapter 2, today's customers seek a service that is quick, reliable and flexible, and yet also offers the lowest price. Thus, these components are central in meeting the customer demands of a maritime logistics system. In this sense, maritime logistics value is reflected in the efficiency and effectiveness of services they provide (Lai, Ngai and Cheng, 2000).

Table 3. 3 Measurement of Efficiency and Effectiveness in Transport Logistics

Supply Chain Process	Measurement Criteria	Performance Indicators
Efficiency-related (Internal facing)	Cost	Total logistics management costs Productivity Return processing cost
	Assets	Cash-to-cash cycle time Inventory days of supply Asset turns
Effectiveness-related (Customer facing)	Reliability	Delivery performance Order fulfillment performance Perfect order fulfillment
	Flexibility and Responsiveness	Response time Production flexibility

Source: Lai et al. (2002, p. 442).

Lai et al. (2002) suggest that "efficiency measures how well the resources are utilised, and effectiveness concerned with the extent to which goals are accomplished" (p. 441). Lai et al. (2002) measure operational efficiency and service effectiveness in transport

logistics: costs, assets, reliability and responsiveness/flexibility. The first two criteria are about efficiency-related indicators, while the other two are effectiveness-related indicators of a firm. Table 3.3 provides a framework for measuring efficiency and effectiveness in the transport logistics context.

Being drawn from Lai et al. (2002), this study suggests two major indicators in assessing maritime logistics value: reduction of lead time and business costs and improvement in service quality (e.g. flexibility, responsiveness, and reliability). The first criteria are concerned with efficiency-related elements, while the others are effectiveness-related components of maritime logistics value. Yet, despite the fact that a time-related indicator is not included in Lai et al. (2002)'s model, the current research considers the reduction of lead time as another important factor for the efficiency of maritime logistics. The reason for this may be due to the fact that a shorter lead time of the maritime transportation system significantly affects the speed and costs of moving cargoes. For instance, if cargoes are not delivered on time as required, this may cause huge repercussions, such as shipping congestion, inefficient utilisation of transport equipment, delays in handling cargoes, and customer dissatisfaction.

On the other hand, this study excludes the 'asset' factor of Lai et al. (2002)'s model from maritime logistics value. The reason is that customers may only be concerned about the service quality and price, regardless of the degree of asset utility of service providers.

In summary, fundamental requirements on the maritime logistics system are improving operational efficiency and service effectiveness in order to satisfy customers in a logistics system. The extent to which the maritime logistics system meets those requirements is referred to as maritime logistics value; and enhancing the maritime logistics value has become the most significant consideration in maritime logistics. The improvement of the maritime logistics value depends on how maritime operators can successfully perform the maritime logistics activities. The specific functions and situations of the maritime operators will be examined in the next section.

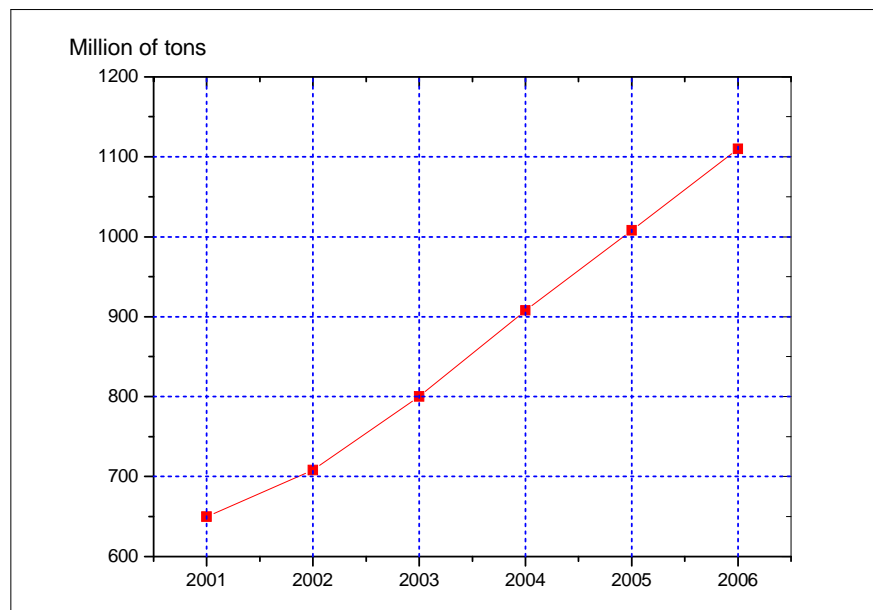
3.3 MARITIME OPERATORS

As stated in the previous section, the key operators in the maritime logistics system are shipping lines, port operators, and freight forwarders. Their behaviours and operational performance directly affect maritime logistics value. The specific function and role of the maritime operators in maritime logistics value is dealt with in this section.

3.3.1 Shipping Lines

Shipping lines are vessel-operating carriers who offer cargo space and regular schedules of sailings (Branch, 2008). This study pays more attention on the container shipping sector, which accounts for much of the world seaborne trade. Over the last decade, worldwide container shipping volumes have steadily increased. Figure 3.3 shows the growth of international containerised shipping volume from 2001 to 2006. Such a growth is due to the sharp increase in containerised international trade. According to a report by the United Nations Conference of Trade and Development (UNCTAD) (2007), “the international trade derived from containerisation have rapidly increased at an average annual rate of 11 per cent since 2001 to reach 88 million TEU in year 2005, and over 70 per cent of the value of world international seaborne trade is being moved in containers.” (p. 20).

Figure 3. 3 Growth of International Containerised Shipping Volume, 2001-2006



Source: UNCTAD (2007, p. 20).

The sharp rise of container movement has led to the rapid growth in shipping volumes carried. Figure 3.4 depicts the world-wide major container shipping routes, which link Asia with North America; Asia with Europe; and Europe with North America.

UNCTAD (2007) reports the volumes of containerised shipping trade of the major shipping routes as follows:

- Asia–North America container trade reaches 18.5 million TEUs in 2006;
- Asia–Europe container trade is estimated to have reached 18.3 million TEUs in 2006; and
- Europe–North America is estimated to have reached 6.2 million TEUs.

Figure 3. 4 World Major Container Shipping Routes



Source: Drawn by the author.

Table 3.4 shows a global ranking of major shipping lines, based on the total TEU capacity deployed by the named carrier. The top ranked firm, Maersk Line, is one of the leading liner shipping firms in the world, serving customers all over the globe, including

Asia, Europe, Africa, Oceania, Central/South America, etc. Other liners ranked in a top class also provide a wider variety of shipping routes around the world. With a small number of large enterprises moving over the world with huge shipping capacity, there are a great number of small and medium sized shipping lines who serve customers with relatively small and specialised shipping routes. Therefore, shipping business is not dominated by a small number of operators, but rather the industry is led by a number of operators who vary in size and service (Panayides and Gray, 1999).

Table 3. 4 World Major Shipping Lines

Shipping Lines	Rank	TEU	Number of Ships
Maersk	1	1,771,097	434
MSC	2	1,513,830	420
CMA CGM	3	844,199	257
Evergreen	4	622,518	178
APL	5	494,721	130
COSCON	6	491,841	145
Hapag-Lloyd	7	491,603	129
CSCCL	8	432,613	122
Hanjin	9	387,169	88
MOL	10	366,041	100
NYK	11	355,532	82
OOLC	12	349,866	83
K Line	13	335,870	104
YML	14	312,430	82
HMM	15	292,014	63

Source: Containerisation International (2009)

Today's shipping lines are enforced to offer higher frequencies, more flexible shipping schedules, reliable and safe sailings, and lower freight rates (Notteboom, 2006). The shipping lines are also required to be effectively integrated in the logistics integration system by moving goods that are geographically scattered as quickly as possible. In order to fulfil the demands of their customers, shipping lines need to develop an efficient liner service network with their customers, other carriers, suppliers, manufacturers and final customers; and they also need to use a well developed information system to share the appropriate transportation information with the market participants and to coordinate multiple linked relationships.

Competition in a shipping industry is intense, and in particular, the competition among shipping lines which have similar shipping routes is very tough. As firms of various

sizes (e.g. large, medium and small firms) co-exist in the shipping industry, the competition among firms of a similar size tends to be more intensive (Panayides and Gray, 1999).

Such intense competition in the shipping industry has facilitated many different types of collaboration among shipping lines. Shipping conferences, vessel sharing agreements and strategic alliances are good examples of this co-operation, and such co-operation aims to protect their business and maximise their profits (Frankel, 1982; Brooks, 2000). Shipping conferences are collaborative organisations of shipping lines which provide similar shipping routes, and the lines cooperate to fix the freight rates in order to reduce competition among themselves and protect their business (Wood et al., 2002). The Transatlantic Agreement (TAA) is a good example of shipping conferences. TAA, which was made in 1993, allows shipping lines which participate in the agreement to control the price rates, capacity of cargoes and other business conditions of shipping services in the North Atlantic (Heaver et al., 2000). However, in recent times, as the Competitiveness Council of the European Union (EU) has decided, as of October 2008, to stop admitting a liner shipping conference in Europe, the shipping lines which move around the region must now consider how to cope with the competitive challenge (Korean Fair Trade Commission, 2009).

Another collaborative form is vessel sharing agreement, which aims to fix the amount of vessel capacity and share the carriers' slot per trip between shipping lines. For example, two shipping lines who are partners for vessel sharing along the same route, fix the vessel capacity to efficiently share their cargoes in order to maintain optimised use of the vessels, offer various time schedules in a more flexible way and deliver the cargoes on time (Lei, Fan, Boile and Theofanis, 2008).

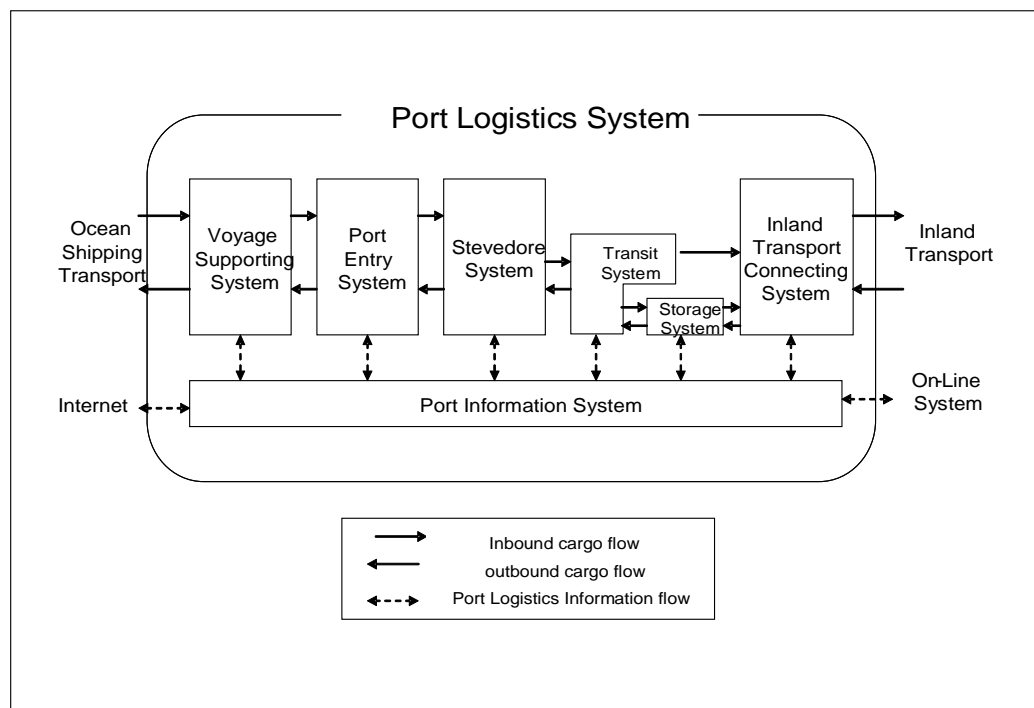
Yet despite the above efforts to survive in the industry, shipping lines are still confronted with a lot of strategic tasks in flexibly responding to the volatile demands of their customers, and in maximising their profits under the dynamically changing business environments. They also need to design and implement optimal strategies in order to gain competitive advantages and to enhance maritime logistics value as a key component in maritime logistics.

3.3.2 Port Terminal Operators

Ports are traditionally known as the place for berthing or anchoring ships and allowing for the transfer of goods from ship to land or ship to ship (Alderton, 1999). Ports are the interface between sea and land, and areas consisting of specific equipments for the ports' functions (Chilomoudis and Pallis, 2002).

Port operators are the inter-mediate component of the logistics integration system, and they offer a cargo handling service as well as various logistics services. Therefore, they need to control their service more quickly and flexibly with minimised costs in order to be effectively integrated into the entire logistics system (Panayides, 2006; Roh et al. 2007).

Figure 3. 5 Port Logistics System



Source: Roh et al. (2007, p. 289).

Roh. et al. (2007) introduce a port logistics concept to describe the ports' role in the logistics integration. The process of port logistics is illustrated in Figure 3.5. They subdivide port logistics into two flows of physical flows and information flows. The upper part of the figure shows a physical flow of moving cargoes through port terminal,

e.g. the port entry system, stevedore system, transit system, storage system and linkage system. All relevant information moves with the physical flow. Each sub-system is interlinked according to the cargo flow in the port logistics process (Roh et al., 2007).

Table 3.5 shows the major global port terminal operators. In 2006, the top five operators controlled about 60 per cent of the global container-handling activity. In contrast to the shipping industry, port terminal operations around the world are dominated by a small number of global port terminal operators (Slack and Fremont, 2005), therefore the market concentration is very high (Drewary, 2006).

Table 3. 5 Leading Port Terminal Operators (as of 2006)

Port Terminal Operator	2006 (Million TEU)	2005 (Million TEU)	% (Change)
HPH	56.5	51.8	9.0%
PSA International	51.3	41.2	24.5%
APM Terminals	47.1	40	17.8%
DP World	42.1	35	20.3%
Cosco Pacific	32.8	26.1	25.7%

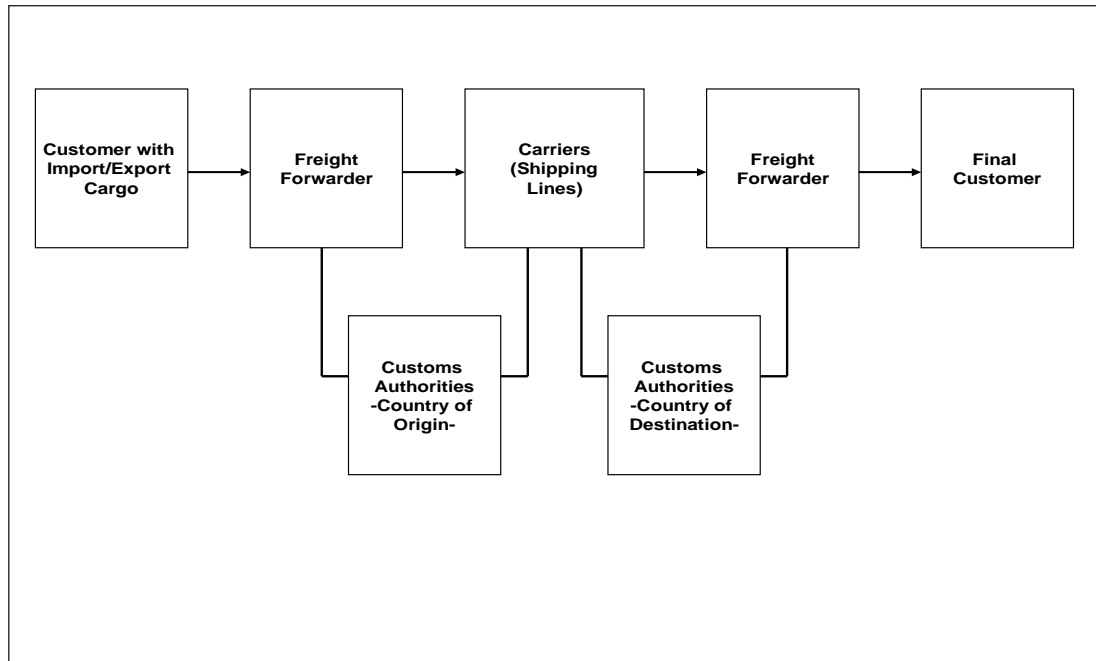
Source: Containerisation International (2007, p. 39).

Since the advent of vigorous privatisation in ports across the world, the competition between port terminal operators has become very fierce. To be successful in today's competitive marketplaces, port terminal operators must considerably refine their strategy of optimising their role in the logistics integration and improving their operational efficiency and service effectiveness.

3.3.3 Freight Forwarders

Freight forwarders are international travel agents who connect shippers and shipping lines, and are the most common intermediaries in global logistics to facilitate cross-border trade (Murphy, Daley and Dalenberg, 1992; Murphy and Daley, 2001; Long, 2003).

Figure 3. 6 Structure of the Freight Forwarding Industry



Source: Bernal et al. (2002, p. 240).

Figure 3.6 describes the operations of global freight forwarders. Being inter-mediate entities between shipping lines and shippers, freight forwarders provide a great number of various services with shippers (i.e. exporter and importer), which include customs authorities in both the country of origin and country of destination. Table 3.6 shows the top twenty global ocean freight forwarders ranked by TEU volumes.

A rapid increase in international trade volumes has facilitated the constant growth of the freight forwarding industry. Freight forwarders vary in type and size, from smaller and more specialised firms who deal with particular types of goods or operate within particular areas, to bigger firms, who can cover huge ranges of goods and geographical areas in their forwarding services. By providing the above crucial maritime logistics services with shippers, freight forwarders play a critical role in moving raw materials to finished products (Bernal, , 2002).

Table 3. 6 Top 20 Global Ocean Freight Forwarder Ranked by TEU Volume (2005)

Freight Forwarder	Rank	TEU
Kuehne + Nagel	1	1,600,000
DHL Danzas	2	1,200,000
Shenker	3	890,000
Panalpina	4	842,000
BDP International	5	800,000
Excel	6	717,000
UPS SCS	7	660,000
Expeditors	8	643,300
NYK Logistics	9	619,000
ABX Logistics	10	500,000
Kerry Logistics/EAS	11	405,000
Kintetsu Worldwide Express	12	311,000
UTi	13	252,000
Nippon Express	14	250,000
TNT Logistics	15	230,000
Hecny/Global Link	16	160,000
Wolf D Barth	17	121,000
Round-The-World-Logistics	18	110,000
Phoenix International Freight	19	101,000
Top Ocean	20	100,000

Source: Global Logistics and Supply Chain Magazine (2006)

Global customers demand that freight forwarders engage extensively in logistics flows and deal with a wider range of logistics solutions on their behalf. For example, freight forwarders are required to provide multiple logistical services, such as custom-house agency, tracking and expediting shipments and offering recommendations about the most suitable shipping routes, rather than offering simple forwarding services (Murphy and Daley, 2001). The specific services provided by freight forwarders are (Coyle, Bard and Novack, 1999; Bernal, Burr and Johnsen et al., 2002):

- Planning the most appropriate route for a shipment, based on nature of the goods, cost, transit time and security;
- Arranging payment of freight and other charges on behalf of the shippers;
- Preparing documentation issues, such as bills of lading (B/L), or any documents required for customs clearance or insurance requirements; and
- Arranging other logistics services, such as inventory management, appropriate packing, warehousing, and inland transportation.

This request of the customers has brought about tougher competition among freight forwarders, and marginalised smaller forwarders who cannot respond to the complex

demands. As a result, big players who can meet the customer needs are getting larger, while small players are either struggling to survive or being liquidated from the industry (Rushton and Walker, 2007). Under such an industrial trend, the industry structure of freight forwarders alters through mergers and acquisitions (M&A) or strategic alliances among the forwarding operators, in order to provide a more agile and flexible service (Bradley, Gooley and Cooke, 1999).

In this section, the functions and role of maritime operators within the context of global logistics have been identified. In order to maximise their role, the operators should offer other supportive logistics services as well as their preliminary service, and manage the smooth flow of goods and cargoes by eliminating barriers impeding the partnership or teamwork along the maritime logistics flow. Those managerial endeavours allow them to achieve their common goal, i.e. the enhancement of maritime logistics value. The next section deals with the current business environment and its changing features in the maritime logistics field, in order to diagnose the environmental position the operators are in. Such a work may help maritime operators to choose the most desirable strategic option.

3.3.4 Environmental Challenges in Maritime Logistics Industry

Over the last decade, the maritime logistics industry has experienced environmental challenges. For instance, the advent of containerisation stimulated shipping lines to carry a greater amount of cargo around the world with larger-sized vessels. Changes in trade patterns, competition, port privatisation and intermodality are significant environmental challenges which affect the strategic behaviours of maritime operators.

- **Larger Size of Vessels**

Having been hugely affected by containerisation, shipping lines now compete to hold vessel size as large as they can, in order to gain advantages of economies of scale and attract powerful shippers with a large amount of products to be shipped (Fremont, 2007). For example, Maersk Line adopts the EMMA MAERSK, which has a capacity of up to 11,000 TEU, and operates the ultra large container vessel for Asia – Europe line. Other leading shipping lines such as CMA CGM, or Hanjin Shipping, have also operated large sized vessels being over 8,000 TEU.

This movement affects the geographical structure of sea transport. Huge vessels make it possible for only a few ports (e.g. hub ports) to accommodate them, which then cause the division of container ports into hub and feeder ports. Under these conditions, an imbalance of power in favour of the shipping lines capable of dealing with a huge amount of cargo has become a new threat to both the small-sized shipping lines and port terminal operators. As a result of the division of container ports, smaller capacity shipping lines and port terminal operators are forced to have new facilities in order to absorb the larger sized vessels and improve productivity (Martin and Thomas, 2001).

- **Intermodality**

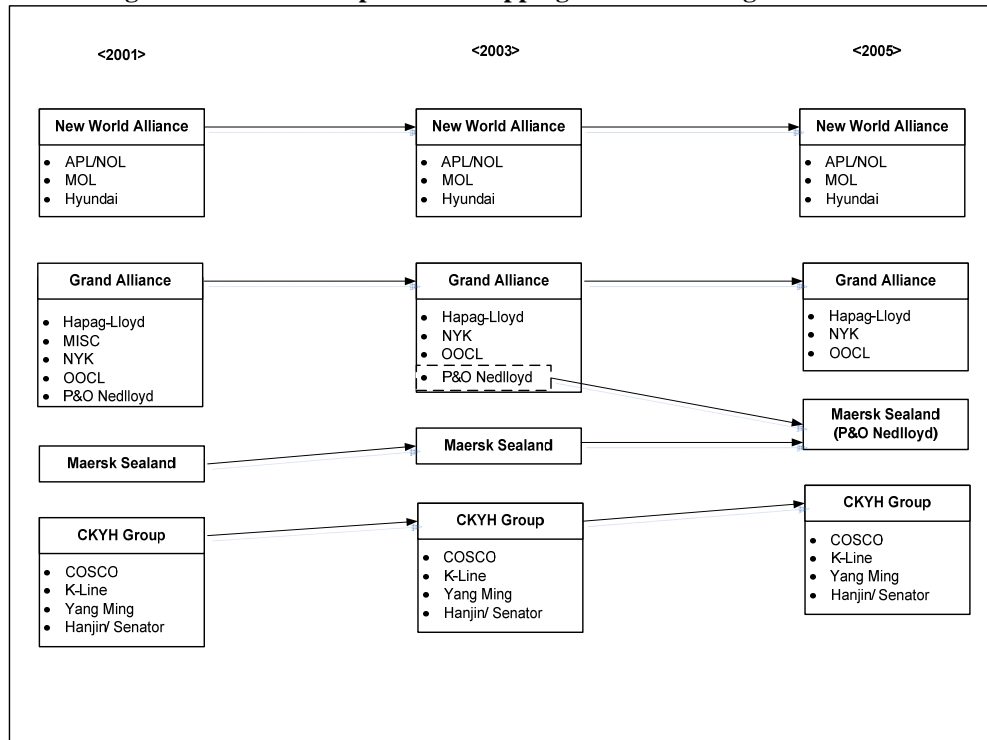
Branch (2007) defines intermodality as “the process of operating a door-to-door/warehouse-to-warehouse service for the shipper involving two or more forms of transport with the merchandise being conveyed in the same unitised form for the entire transit ” (p. 401). Most shippers normally arrange two or more forms of transport modes in order to ensure that their goods are efficiently delivered to the final destination. Maritime transportation is an inter-mediate mode which connects other modes of transport such as road, rail, air and sea. In order to offer a single transport package service and achieve quick door-to-door delivery, maritime operators are forced to put together all possible transportation modes and to coordinate with other modes of transport (Marlow and Paixao, 2003). For example, ports should ensure that cargoes are smoothly and safely connected into road or rail modes and delivered to their final destination (Song, 2003). Today it is extremely important for maritime operators to combine the complexly connected intermodal system in an efficient and reliable manner, since it may affect the performance of logistics integration.

- **Alliances and Integration of Shipping Lines**

The challenges in vessel size and intermodality have boosted the coordination and co-operation among shipping lines, who wish to collectively respond to the large enterprises with huge sized vessels and flexibly offer the best customised shipping schedule. Global strategic alliances are the most popular form of the shipping lines’ co-operation. Evidence of three large strategic alliances and one merger and acquisition are described in Figure 3.7. The Grand Alliance consists of Hapag-Lloyd, Nippon Yusen Kaisha (NYK) and Orient Overseas Container Line (OOCL), who plan to extend their co-operative relationship up to 2017. Cosco/K-Line/Yangming/Hanjin Alliance and New World Alliance are also one of the most popular strategic alliances in the shipping

industry. In 2005, Maersk Sealand acquired P&O Nedlloyd, which was a member of the Grand Alliance.

Figure 3. 7 The Participation of Shipping Lines in Strategic Alliances



Source: Busan Port Authority (2007, p. 27).

Such strategic alliances aim primarily to improve service qualities by increasing the number of ports of call, broadening the range of shipping routes, and providing a world-wide network of shipping services. Shipping lines also attempt to realise cost saving, increase their market share, share capital investments and reduce industry risks throughout the strategic co-operation (Yoshida, Yang and Kim, 2004).

On the other hand, vertical integration of shipping lines is another significant strategic choice in the shipping business. Vertical integration is referred to as the integration among organisations which act in different stages in global logistics (Christopher, 1998). Shipping lines expand their business into port operations through vertical integration. Table 3.7 shows examples of vertical integration by shipping lines, which recently entered the terminal operation business of dedicated terminals at major load centres across the world. The purposes of shipping lines entering the terminal operation are to reduce costs and allow them to have priority to use their own terminals, and also to

provide shippers with a more stable service. The integrations also enable shipping lines to offer a wider range of services, and allow them more control over shipments.

Table 3. 7 Shipping Lines' Involvement in Port Terminals

Shipping Line	Port Terminals
Maersk	Hong Kong, Kaohsiung, Yokohama, Rotterdam, etc.
Maersk Line	Oakland, Long Beach, New York/New Jersey, etc.
Evergreen	Los Angeles, Tacoma, etc.
COSCO	Hong Kong, Shekou, etc.
NOL/APL	Karachi, Los Angeles, Oakland, etc.
OOCL	Kaohsiung, Vancouver BC, etc.
Hyundai Shipping	Long Beach, Busan, Gwangyang, Kaohsiung, etc.
Hanjin Shipping	Long Beach, Busan, Gwangyang, Kaohsiung, Seattle, Chicago, Tokyo, Osaka, etc.

Source: Busan Port Authority (2007, p. 28).

The above strategies (i.e. strategic alliance and vertical integration) have facilitated the advent of the bigger shipping group, which results in the increase in negotiation power of the huge shipping group. The powerful shipping groups are demanding much more favourable service charges and operational conditions to port terminal operators, and such demands have become a huge threat to port terminal operators (Notteboom, 2004). This threat has caused port terminal operators to react aggressively, through collaboration with port terminal operators in other parts of the world.

• Port Privatisation

Privatisation is referred to as “the transfer of ownership of assets from the public to the private sector or the application of private capital to fund investments in port facilities, equipment and systems” (World Bank, 2006, p. 120). The port privatisation process is deemed as one of the most significant challenges in the maritime logistics industry.

In recent times, governments in many countries allow port operations to be managed by private companies. Under the policy, the public sector focuses only on planning and administrating the whole port operation with some regulations, and private sectors perform the specialised works of overall port operation (World Bank, 2006).

Privatisation of ports has facilitated more intensive competition among port terminal operators who aggressively seek to gain high revenue. On the other hand, it has also created new opportunities for port terminal operators to freely enter new foreign markets and transfer their own advantages overseas (Slack and Fremont, 2005).

- **Globalisation of Port Terminal Operators**

Port terminal operators are threatened by their customers, i.e. shipping lines, who have become bigger and more powerful. Port terminal operators are forced to establish large new terminals and invest huge amounts of money for information systems and modern communication technologies, in order to handle the huge amount of cargoes moved by the larger sized vessels (Shang and Marlow, 2005). Port terminal operators more actively seek strategic solutions by co-operating with each other. For example, PSA and HPH are involved in joint ventures for the mutual interests of securing their business. In China, HPH now cooperates with Shanghai Port Container Co. Ltd. by investing in their 50/50 joint venture (De Souza, Berresford and Pettit, 2003).

As another prominent strategic alternative, port terminal operators are globally expanding their business. Table 3.8 gives a brief summary of the global expansion of global port terminal operators. Such expansion enables port terminal operators to increase both their competitive influence in their business and their negotiation power against other shipping lines; and they can establish barriers to protect their business by broadening their business scale and scope (Heaver, 2002; Notteboom, 2004). New foreign markets, where port terminal operators have newly entered, could also give port terminal operators new opportunities to reach valuable resources which help them gain a new competitive advantage (Notteboom and Winklemans, 2001; Slack and Fremont, 2005).

- **Competition Environment**

Competition among maritime operators is getting intensive. For example, ports in the same region compete with each other intensively in order to lure customers. As today's larger and fewer shipping lines make the extent of profits from one customer of port terminal operators much greater, the competition among port terminal operators has become increasingly fierce. On the other hand, the competition among port terminal operators can be also seen on an inter-regional basis, depending on the accessibility to large inland transport networks (McCalla, 1999; Huybrechts et al., 2002; Song, 2003).

Table 3. 8 Global Expansions of Port Terminal Operators

Global Port Terminal Operators	Europe	North America	East and North Asia
HPH	Felixstowe, Rotterdam (ECT, Delta, ECT Home, Hanno), Thamesport, Harwich, Gdynia		Hong Kong (HIT, Cosco-Hit, Asia Port, Rivertrade), Shanghai (SCT, SPICT), Yantian, Juizhou, Nanhai, Shantou, Jiangmen, Gaolan, Xiamen, Ningbo, Guangdong, Shanghai Mingdong, Busan, Kwangyang (HKT, KIT)
PSA	Antwerp, Zeebrugge, Genoa, Venice, Shines		Singapore, Dalian, Nantong, Fuzhou, Guangzhou, Tiancang, Incheon, Hibiki
Eurogate	Bremerhaven, Hamburg, La Spezia, Giaio Tauro, Lisbon, North Sea Terminal, MSC Gate, Livorno, Salerno, Contentori Ravenna, CICT Porto, Rjeka		
SSA		Los Angeles, Long Beach, New Orleans, Oakland, Portland, Seattle	
Cosco	Antwerp, Naples (Molo Bausan)	Long Beach	Hong Kong (Cosco-HIT), Dalian (DPC, DPCT), Qingdao (QCIT, QQCT), Shanghai (SPICT, SCT), Zhangjiagang, Yantian (YICT), Yingkou, Yangzhou Yuanyang, Quanzhou, Tianjin, Nanjing, Zhenjiang Jinyuan, Taicang
DPW	Southampton, Tilbury, Antwerp, Le Havre, Germersheim, Constantza, Marseille-Fos	Vancouver	Yantai, Shekou, Hong Kong, Tianjin, Qingdao, Pusan, Vostochny
APMT	Aarhus, Rotterdam, Antwerp, Bremerhaven, Dunkirk, Giaio Tauro, Constanza	Tacoma, Oakland, Los Angeles, New York, Baltimore, New Orleans, Portsmouth, Charleston, Jacksonville, Hampton, Port Everglades, Miami, Houston	Kobe, Yokohama, Dalian, Qingdao, Shanghai, Guangzhou, Kaohsiung, Yantian

Source: Compiled from the Ministry of Land, Transport and Maritime Affairs in Korea (2008).

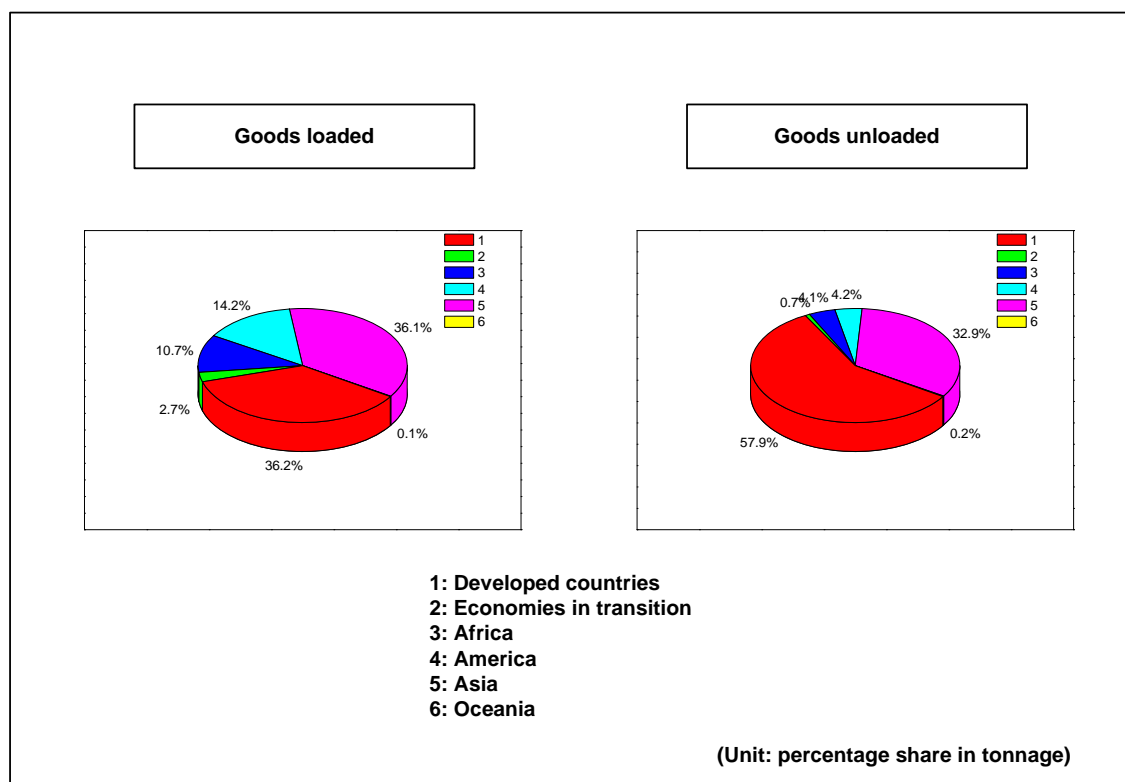
Shipping lines and freight forwarders are no exception in confronting with the intensive competition in the marketplace. Shipping lines are required to offer a shorter transit time and regular voyage schedules with lowest price by shippers (Brooks, 2000). In order to respond to the demands, shipping lines make huge efforts to closely scrutinise their

schedules and intensively compete with each other to get a powerful shipper who can book the vessels with huge amount of volumes (Panayides and Gray, 1999). As addressed in the previous section, the competition among freight forwarders is also tough, as they are being forced to provide a wider variety of logistics services at a lower price.

3.3.5 Maritime Operators in Korea

According to UNCTAD (2007), the world seaborne trade reached 7.4 billion in 2006, and the ratio of the seaborne trade taking place in Asia accounts for a large portion of this number. Asia facilitates over thirty percent of the world seaborne trade. As shown in Figure 3.8, the seaborne trade of goods loaded by Asia is 36.1 percent, and goods unloaded in the region are 32.9 percent. Such an increase in seaborne trade in Asia has facilitated a dramatic growth of ports in Asia.

Figure 3. 8 World Seaborne Trade by Country Group



Source: UNCTAD (2007, p. 6).

Over the last decade, container capacity in Asian ports has continued to increase. Table 3.9 describes the world ranking of ports based on container throughputs of the ports. As seen Table 3.9, the top five ports are all Asian ports; and eight ports of the top ten ports are also all Asian ports. In particular, the increase in trade of inbound/outbound, or within the Northeast Asian countries, has facilitated the growth of ports in that region. The total container throughput in Northeast Asian countries, including Korea, China and Japan, recorded over one hundred million TEU in 2004. That numerical value accounts for 31.1 per cent of the total TEU throughput over the world. Ports in that region intensively compete with each other in order to handle more cargoes and be a major hub port (Busan Port Authority, 2007).

Table 3. 9 World Ranking of Ports and Container Throughput (2008)

World Ranking	Port Name	Trade Region	Total TEU
1	Singapore	South East Asia	29,918,200
2	Shanghai	East Asia	27,980,200
3	Hong Kong	East Asia	24,248,000
4	Shenzhen	East Asia	21,413,888
5	Busan	North East Asia	13,425,000
6	Dubai	Mid-East	11,827,299
7	Ningbo	East Asia	11,226,000
8	Guangzhou	East Asia	11,001,300
9	Rotterdam	Northern Europe	10,800,000
10	Qingdao	East Asia	10,320,000
11	Hamburg	Northern Europe	9,700,000
12	Kaohsiung	East Asia	9,675,554
13	Antwerp	Northern Europe	8,663,736
14	Tianjin	East Asia South East Asia	8,500,000
15	Port Klang	South East Asia	7,970,000
16	Los Angeles	North America West Coast	7,849,985
17	Long Beach	North America West Coast	6,487,816
18	Tanjung Pelepas	South East Asia	5,600,000
19	Bremen/Bremerhaven	Northern Europe	5,500,709
20	New York/New Jersey	North America East Coast	5,265,053

Source: Containerisation International (2009).

In recent times, thanks to the above environmental benefits, Korea has become a key logistics centre in Asia. The current dramatic growth of China's economy and increase in trade cargo volumes inbound/outbound China has also triggered the rise in container throughputs in Korean ports, by boosting the tranship services on those cargoes between China. Furthermore, Korea's location is geographically significant, since the ports in Korea are multiply linked with the North American, South-East Asian and European routes.

Along with the above economic opportunities, Korea has proactively developed their ports and maritime logistics infra-structures in order to play a key role as a logistics hub in Asia. Maritime logistics and port operation is now the core industry in the Korean economy. The Korean government now invests in railways and ports much more than roads, in order to link the main arterial railway lines to all the major ports and to improve the overall efficiency of logistics flows (Rushton and Walker, 2007).

With the geographic and strategic importance in mind, this study is targeted at Korean maritime logistics operators, aiming to derive meaningful strategic implications in maritime logistics and maritime logistics value. Another possible benefit of the study targeting to Korea may stem from the fact that it is the native country of the researcher, which then allows the researcher to collect rich data in an easier and more efficient way.

- **Port Terminal Operators in Korea**

In accordance with the development of Asian ports since the late 1980's, three major Korean ports in Busan, Incheon, Gwangyang, have grown rapidly in the last two decades. Table 3.10 shows the changes in container throughput in Korea. Between 1980 and 2005, the total volume of cargo handled in Korea grew nearly twenty-two times, reaching 15,158,000 TEUs in 2005. The volume in import and export has increased approximately 13.5 times, and in particular the volume in transshipment has risen steeply, nearly 325 times during the period. The Korean ports gained the most profit from the transshipment cargoes, but in recent times the growth rate in transshipment has slowed, influenced by the increasing direct-call cargoes to China without transshipping in Northeast Asian ports (Ryoo and Hur, 2007).

In this environment, the Korean government attempts to build large-scale logistics complexes in port hinterlands to increase the volume of cargo handling, in order to make efforts to induce foreign investments of leading global logistics firms. In addition, the Busan New Port project, which aims to handle the ever-increasing container cargoes, was launched. They have operated in container terminals since 2007.

The port terminal operators in each port in Korea are as follows:

- Six port terminal operators in Busan Port: Hutchison Busan Container Terminal, Busan International Container Terminal, Busan Gamman Container Terminal, Dongbu Pusan Container Terminal, Sebang Container Terminal, Korea Express Container Terminal;
- Five operators in Busan New Port: Busan New Port Company, Hanjin Container Terminal, Hyundai Container Terminal, Busan New Port Container Terminal, Busan New Port South Container Terminal;
- Five operators in Incheon: Sunkwang International Container Terminal, Incheon Container Terminal, HJS, Korea Express, and E1 Container Terminal; and
- Four operators in Gyangyang: Gyangyang International Container Terminal, Hutchison Korea, Korea Express, Dongbu, and Korea International Terminal.

Table 3. 10 Container Throughput in Korea 1980-2005

(unit: 1,000 TEU)

Year	Import and Export			Transshipment	Coast	Total
	Import	Export	Total			
1980	289	403	692	0	0	692
1985	544	715	1,259	17	0	1,277
1990	1,046	1,348	2,393	75	0	2,469
1995	1,916	2,026	3,942	430	117	4,488
2000	3,196	3,225	6,421	1,264	274	9,191
2001	3,306	3,285	6,591	3,111	289	9,990
2002	3,645	3,710	7,356	4,205	330	11,890
2003	4,110	4,072	8,182	4,599	405	13,185
2004	4,518	4,506	9,025	5,159	340	14,524
2005	4,728	4,684	9,412	5,533	273	15,158
Average rate of annual growth rate (1980- 1990)	13.7%	12.8%	13.2%	27.6%	-	13.6%
Average rate of annual growth rate (1991- 2000)	12.2%	9.4%	10.7%	37.8%	12.0%	14.9%
Average rate of annual growth rate (2001- 2005)	9.4%	9.3%	9.3%	15.5%	-1.4%	11.0%

Source: Busan Port Authority (2007, p. 24).

The port terminal operators within a port intensively compete with each other in price and service in order to attract the greater cargoes. Since the opening of Busan New Port in 2007, Busan Port and Busan New Port have operated at the same time in the same region, which in turn causes an over-supply of port terminal operations. The over-supply has triggered an intensive battle to determine which of the port terminal operators in the two ports can achieve the greater amount of container cargoes. Such

tough competition has caused a poor and in some cases even negative amount of profit (Korean Maritime E-Press, 2008).

In recent times, port terminal operators have tried to take action to escape such an ineffective, intensive competition. For instance, port terminal operators' managers in Busan and Busan New Ports meet and discuss the way to co-operate in order to pursue mutual business interests. They also try to co-operate with each other by contracting the common usage of container berths, aiming to reduce anchoring time and increase the rate of stevedoring turnover. Yet despite such co-operative efforts, the tough competition between operators means that port terminal operators within a port hesitate to establish long-term based formal co-operative relationships in the form of strategic alliances or joint ventures, as these alliances require a great deal of financial commitment (Korea Shipping Gazette, 2009).

Thus, the port terminal operators are now seeking a new strategic alternative in order to survive the competitive marketplace and improve sustainable competitive advantage and financial profits. Busan Port Authority (2007) proposes that port terminal operators should focus more on customer satisfaction with high quality of service. In addition, effective human resource management and knowledge management strategy may be a good strategic solution towards the improvement in service quality and operational efficiency, which also helps the ports become the most competitive in the Asia region (Busan Port Authority, 2007).

- **Shipping Lines in Korea**

The shipping industry in Korea consists of a small number of large enterprises such as Hanjin Shipping and Hyundai Shipping, and over one hundred sixty small and medium sized lines. Korean shipping lines have followed the world-wide shipping trends by increasingly enlarging their vessels. For example, Hanjin Shipping, which is the biggest shipping company in Korea, runs more than 90 container ships and has more than 60 sea lanes around the world. It has deployed 8,000 TEU vessels since 2007 and has tried to maximise the benefits derived from economies of scale and customers' satisfaction. On the other hand, such larger sized vessels have threatened small and medium sized shipping lines in Korea.

Like global shipping lines, Korean shipping lines also join inter-organisational collaboration in the forms of strategic alliance, consortium or conferences. For example, in early 2003, Hanjin Shipping was involved in a strategic alliance with COSCO of China, Yang Ming of Taiwan, K-Line of Japan, and Senator Line of Germany, named the CKYHS Alliance. Hyundai Shipping also participates in a global strategic alliance with MOL and APL/NOL, referred to as the New World Alliance.

On the other hand, small and medium sized shipping lines proactively cooperate with each other in order to maximise their profit and secure their business. For example, there are a number of joint shipping groups among leading medium sized- shipping lines in Korea. SINOKOR and C&Line, became partners in a joint shipping service on Korea – Japan shipping routes in 2008. In shipping routes across Korea – China – Japan, there are several collaborative shipping groups: KMTC Joint Shipping Group (i.e. being consisted of KMTC, Chunkeoyng, Bumju, and Taeyoung), and Heung-A Joint Shipping Group (i.e. being consisted of Heung-A, C&Line, Dongjin and Dongyoung) (Korea Shipping Gazette, 2008).

Korean shipping lines also participate in various forms of collaborative associations such as the Korea Shipping Association or the Korea Shipowners' Association. Most of the shipping lines in those associations maintain close contact with related shipping organisations to pursue their common objective.

In recent times, the global financial crisis and unstable global oil price have also made the shipping lines suffer from serious managerial difficulties (Korean Maritime E-Press, 2009). The economic slump of the container liner industry has been prolonged, and shipping charges have sharply declined. A serious imbalance of supply and demand in vessels, which is led by large enterprises with larger-sized vessels, have caused destructive price competition between shipping lines in Korea. Therefore, most Korean shipping lines intensively compete with each other to survive in the industry. With such conditions, small and medium sized shipping lines focus on more specialised shipping routes in order to escape direct competition with large enterprises. Korean shipping lines are also turning their eyes to forwarding business, aiming to provide a service package which integrates shipping and forwarding (Korea Shipping Gazette, 2009). Thus, shipping lines in Korea, which no longer gain competitive advantages solely

through the use of low prices, are also seeking other strategic options in order to improve their service quality.

- **Freight Forwarders in Korea**

The number of freight forwarders in Korea has rapidly increased since the mid 1990s, with over 1,300 operators running in 2007. Such rapid growth stems mainly from the increase in global trade volumes. A relatively low entry cost into the business has also facilitated the development of the industry.

While global leading freight forwarders have focused on enlarging their size in order to provide various logistics services and establish their business foothold, Korean freight forwarders have not followed the global trend in the field. For example, over ninety percent of forwarders are small sized organisations which have, on average, 16.2 employees per one company, and they do not create high financial profit in their business. Such a poor business situation may be due in part to the insufficient support offered by the Korean government, as the forwarding business has been treated as merely one of a service business type, rather than fostered business supported by the government (Korea Maritime E-press, 2009).

As regards the competition among Korean forwarding firms, they intensively compete with each other in order to attract the greater number of customers. However, as mentioned in the above, as the financial capability and firm size of freight forwarders in Korea is generally weak, forwarders cannot offer differentiated services by broadly extending the scope of their services. Consequently, the extent of freight forwarders' competition is extremely tough.

Furthermore, today's decrease in volumes of global trade owing to higher oil prices and the global financial crisis are added threats to surviving the industry. In recent times, the freight forwarders have cooperated with each other in the form of a consortium. The consortium allows them to share firms' specialised competence, while at the same time allowing them to maintain their own business. For example, the Cho Yang Consortium, which consists of eight international forwarding companies, was launched to provide complex logistics services at Incheon Port (Industry Information the Age of E-biz, 2009). The freight forwarders also try to keep closer to each other in a more indirect manner by joining freight forwarding associations or meeting at informal places.

However, unlike foreign global freight forwarders, Korean forwarders have been slow to aggressively cooperate with each other by establishing broad strategic alliances or joint ventures in their business. Therefore, Korean forwarders are vulnerable to the possibility of foreign forwarding collaborative groups entering the Korean forwarding industry (Korea Shipping Gazette, 2009). In this regard, the freight forwarders in Korea need to reconsider their strategic behaviour and restructure their competitiveness in a more co-operative manner.

In summary, maritime operators, including Korean operators, are currently faced with various environmental challenges and threats. They have been forced to cope with the environmental requirements, leverage their managerial profits and improve their global competitiveness and maritime logistics value. In order to respond to this environmental threat, maritime operators have entered into strategic alliances, or fostered global expansion of their business scope. These strategies may allow maritime operators to achieve economic benefits in terms of the business cost, which is derived from economy of scale and scope.

However, as addressed in the previous sections, the most significant strategic task of today's maritime operators is improving maritime logistics value. The aforementioned strategic behaviours of maritime operators and existing literature could not provide a clear insight into the way to improve operational efficiency and service effectiveness. In this regard, a more systematic strategic approach is needed. Therefore, an in-depth discussion on maritime operators' strategy should be made by identifying strategic goals, the level of strategy and the way to design and implement the strategy (Oliver, 2005). The next section will deal with those strategic issues before reviewing strategic management theory and identifying a possible strategic option in the next chapter.

3.4 QUEST FOR A NEW STRATEGIC DIRECTION

This section rationalises the need for a new strategic direction for maritime operators. Strategic management refers to the process of “formulating, implementing, and evaluating cross-functional decisions that enable an organisation to achieve its objectives.” (David, 2005, p. 5). Generally speaking, the strategic approach for an organisation needs to identify the unit of a target analysed, clarify a strategic objective

and levels of a strategy, access its business environments, and then construct a strategic direction towards the strategic goal. The following sections elaborate those factors from maritime operators' strategic point of view.

3.4.1 Maritime Operators as a Global Business Unit

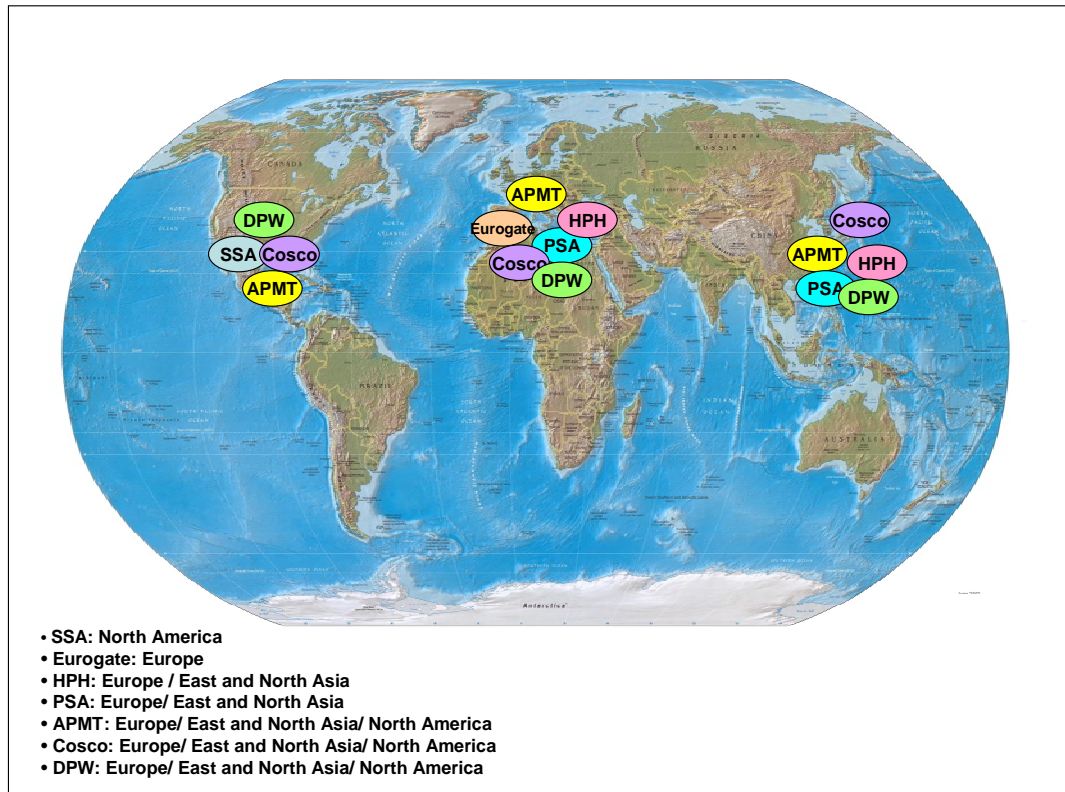
Maritime operators are involved in global business by moving goods across the world. Shipping lines move around the world to carry cargoes to destination. Large enterprises such as Maersk Line, MSC, or APL, have their own subsidiary in every country where they move to, and currently they are also expanding their business scope by establishing their own dedicated port terminals across the world (Oliver, 2005). Small and medium sized shipping lines that do not cover a great number of shipping routes over the world are more likely to specialise in a few shipping routes. Most of them have their branches in the country in which their shipping is specialised, with the aim of reducing the uncertainty of the foreign market and offering a more differentiated service as an expert of the country.

As regards freight forwarders, they need to process a number of documentary works of international trade on behalf of shippers, and to handle logistics activities such as warehousing, inventory management or inland transportation, in both domestic and foreign countries. Therefore, freight forwarders should be well versed in the foreign countries where they are mainly specialised. In those circumstances, a great number of freight forwarders are proactively establishing foreign branches or collaborating with local companies in the foreign market, in order to provide more agile and differentiated services to their customers (Korea Shipping Gazette, 2008).

Port terminal operators are also involved in international operations. For example, global leading port terminal operators, such as DP World, PSA Corporation and Hutchison Port Holdings, are also aggressively expanding their business across countries. Figure 3.9, which is depicted based on Table 3.8, shows the current situation of the global expansion of port terminal operators. The operations of the global port terminal operators overlap with each other on a regional basis, and thus they should compete with each other simultaneously in various markets (Jannelle and Beuthe, 1997).

With the above discussion in mind, this study regards the maritime operators as a global business unit whose operation is involved in over two countries (Hill, 2001).

Figure 3. 9 Global Expansions of Port Terminal Operators



Source: Drawn by the author.

With reference to a strategic objective, the strategic objective (or goal) is referred to as “the desired future positions of the organisation” (Robson, 1997, p. 20). Firms may have several goals under their mission (or vision). As addressed in the early part of this chapter, maritime logistics value, i.e. improving operational efficiency and service effectiveness, is the most significant consideration of today’s maritime operators. Therefore, the enhancement of maritime logistics value is the strategic goal of maritime operators.

3.4.2 New Strategic Approach for Maritime Logistics Value

When facing changes in environmental conditions, many organisations alter their strategies in order to cope with the challenges and survive the market (Dess and Origer, 1987; Wieserma and Bantel, 1993; Van de Ven and Poole, 1995). Thus, maritime operators, facing challenges in internal/external environment and business requirements, have to design new strategic options in the best way possible. The fundamental considerations for the new strategic direction would be how they could develop their capability to realise a more efficient operation and more effective service, while simultaneously diminishing the environmental uncertainty.

Generally speaking, before adopting a new strategic option, firms have to consider the following two levels of organisational strategy, which are related to which business they choose to operate in and how to compete in the chosen business: corporate-level strategy and the latter business-level strategy (Herbert, 1987).

Corporate-level strategy is associated with the strategic decision on deciding the scope of a firm's business. For example, expanding a firm's business scope by strategic alliance or joint venture with firms which operate in the different sector of business, vertical integration, corporate diversification and merger and acquisitions (M&As) (Rumelt, 1974; Barney, 2002), are well known as representative corporate strategies. A firm's decision on leaving or quitting a certain business may be included in the corporate-level strategy. When implementing the strategy, the strategic performance depends on how different business units are well coordinated, and how the firm's core competence is well transferred between business units within a firm (Prahalad and Hamel, 1990).

Business-level strategy is related to how well a firm competes in a given business. Thus, the business-level strategy is primarily concerned with maximising a firm's competitive advantage and achieving its strategic objective in the chosen marketplace (Rumelt, 1974; Barney, 2002). Porter's (1985) cost leadership and product differentiation strategy are well known strategies in this level.

The current study is mainly interested in achieving the strategic goal of maritime operators within the given business, i.e. shipping, port operation and freight forwarding, rather than newly entering other business sectors or diversifying the business scope of

maritime operators. Therefore, such strategic issues of maritime operators should be discussed in the business-level of strategy.

However, as addressed in the previous section, the literatures on the strategic behaviour of maritime operators have not clearly defined how maritime operators improve maritime logistics value. In this sense, a wider spectrum of literatures on strategic management theories and practices should initially be reviewed, and the advantages and disadvantages of key strategic alternatives should be examined. The most suitable strategic practice can be then chosen for maritime operators. The next chapter will deal with those strategic issues in more detail.

3.5 SUMMARY

In this chapter, the concepts of maritime logistics and maritime logistics value, and the role of maritime operators in maritime logistics are examined. This chapter also identifies the environmental challenges which maritime operators face. The Korean maritime operators are then introduced as a major player in the global maritime logistics industry.

This chapter clarifies the strategic goal of maritime operators and discusses the need to find a new strategic direction towards the strategic goal. In order to examine the most appropriate strategic alternative, the next chapter will elaborate on strategic management theories and practices which help to improve operational efficiency and service effectiveness.

CHAPTER 4 REVIEW OF STRATEGIC MANAGEMENT THEORY

4.1 INTRODUCTION

Strategic management scholars have tried to discover the determinants of firms' competitive advantage. Such attempts have triggered the advent of a great many significant strategic theories, e.g. industrial structure theory, resource-based theory, transaction theory, contingency theory, social capital theory and the knowledge-based approach.

The importance of a strategic approach for maritime logistics value was clarified in Chapter 3. This chapter examines which theory or practice in strategic management would be the most appropriate in achieving the current strategic goal of maritime operators. A critical review of central strategic management theories regarding the discussion on maritime logistics value, i.e. the strategic goal of maritime operators, is provided.

The first section of the chapter reviews the academic stream of the strategic management field, and introduces the central theories which constitute the main stream. Other complementary strategic viewpoints on inter-organisational relationship, such as network embeddedness perspective and co-opetition strategy, are elaborated on in the next section in order to discuss how firms effectively acquire and manage knowledge resources. Finally, the most appropriate theory and practice in solving the current strategic task of maritime operators, i.e. knowledge-based perspective, is then chosen and justified in the following section.

4.2 AN OVERVIEW OF STRATEGIC MANAGEMENT THEORIES

4.2.1 Strategy and Strategic Management Defined

There have been several attempts to define firms' strategy. Lowson (2002) defines strategy as "an organisation's sense of purpose- a guiding purpose or policy, a focus statement, even a philosophy, for the achievement of an objective" (p. 40). Robson (1997) defines a strategy as "the pattern of resource allocation decisions made throughout an organisation" (p. 5). Porter (1980) indicates that a competitive strategy can determine the way to compete and achieve an organisational goal. In this sense, strategy is often understood as the 'policies', 'patterns', or 'directions' that business organisations undertake in order to survive in a competitive market.

Strategic management is concerned with a successive organisational process of designing and implementing a given strategy, and controlling the outcome of the process. The primary goal of strategic management is to explore a source of firms' competitive advantages and discover the determinants of firm performance (David and Montgomery, 1997). Strategic management involves various managerial activities, which are (Rumelt, Schendel and Teece, 1994):

- To set organisational goals;
- To make decisions on where firms place their competitive position in the marketplace;
- To determine the scope and level of products and services they offer;
- To efficiently administer firms' organisation; and
- To effectively allocate and coordinate resources.

Those strategic activities must be managed in accordance with other managerial decisions, for example, marketing, financing, manufacturing and related supporting systems, in order to achieve organisational goals (David and Montgomery, 1997). Thus, strategic management is a multidisciplinary task which coordinates the entirety of managerial policies. It triggers the co-development with other academic theories in the field (Barney, 2002).

4.2.2 The Academic Stream of Strategic Management

Studies of strategic management have evolved into main issues or themes, and analytical techniques over time. Lowson (2002) summarised the evolution of strategic management, as shown in Table 4.1 and Figure 4.1.

The theory and practice of strategic planning and management has been examined in the business field since 1910, when some early designs on organisational strategy were conceived by certain firms. But it was not until the 1960s that an academic approach to strategic management theory was fully realised, in accordance with the demand for a systematic way to forecast, plan and integrate increasingly complicated business activities (Robson, 1997).

Table 4. 1 The Evolution of Strategic Management

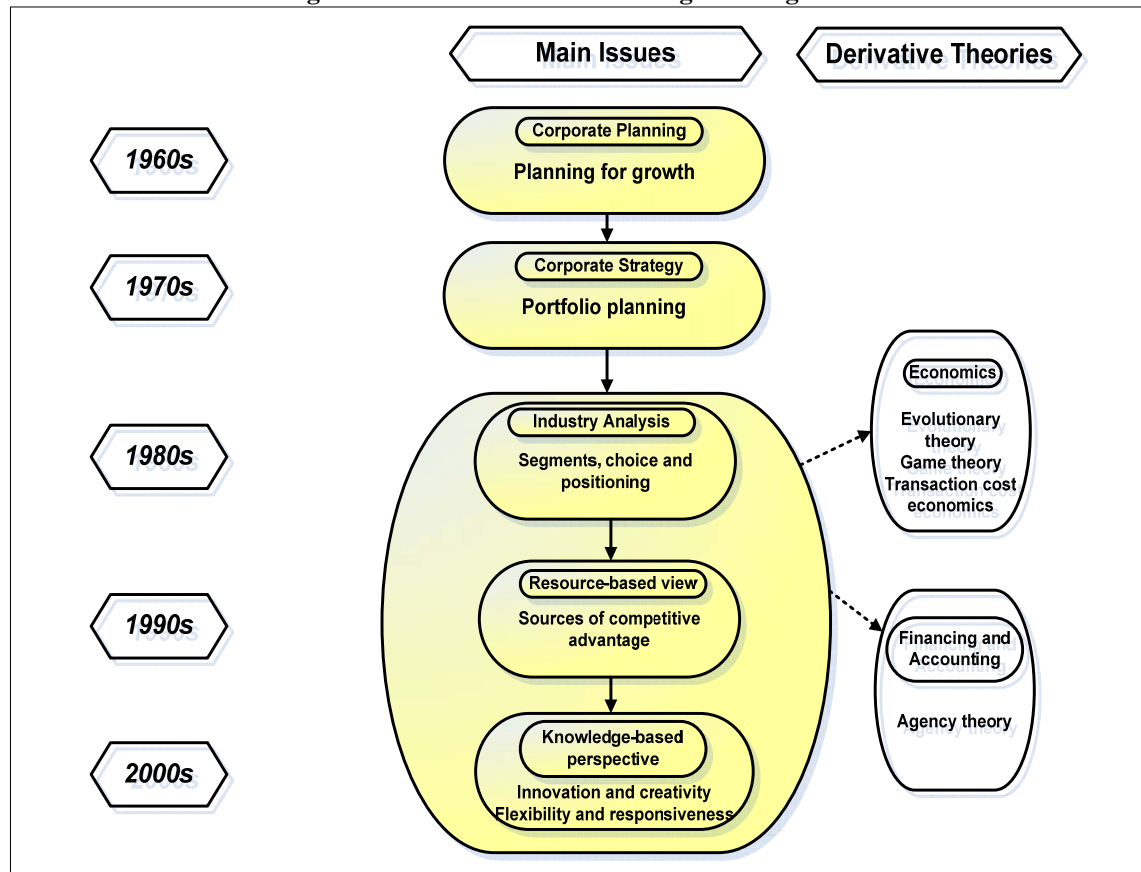
	1960s	1970s	1970s-1980s	1980s-1990s	2000s
Dominant theme	Corporate planning	Corporate strategy	Industry analysis	Competitive advantage	Innovation and creativity
Main issues	Planning for growth	Portfolio planning	Segments, choice and positioning	Sources of competitive advantage	Flexibility and responsiveness
Concepts and techniques	Forecasting and modelling	Synergy, strategic business units, matrices and experience curves	Structure and competitor analysis	Resources Core competencies	Rapid diversification, knowledge and learning
Implications	Planning Departments and the five year plan	Diversification, multidivisional, globalisation	Selectivity, restructuring and asset management	Business process re-engineering, outsourcing, restructuring and refocusing	Virtuality, knowledge bases and network management

Source: Lowson (2002, p. 45).

Prior to the 1960s, strategic management was understood as the managerial planning activities involved in defining organisational objectives, in the collection and allocation of resources, and in the implementation of the planned schedule. But during the 1960s, as a result of diversification, many firms grew in scale and scope (Shleifer and Vishny, 1991). This, coupled with the environmental challenges that many firms experienced during the same time, made firms realise that simple planning and forecasting was not always accurate. The outcome of this was the realisation that integrated and longer-range corporate planning was needed for firms to survive in the marketplace. With this realisation in mind, managers and academic researchers then set about exploring

strategic solutions to reduce environmental uncertainty, and to discover the most suitable way of competing effectively and forecasting market situations from a long-term perspective.

Figure 4. 1 The Evolution of Strategic Management



Source: Modified from Lowson (2002, p. 45).

Such efforts accelerated the 1970s academic development in the field, when the term firms' strategy became more commonly used (Robson, 1997). During this period, the Boston Consulting Group developed several analytic tools on strategic consulting. The team introduced the concepts of 'experience curve' and 'growth-share matrix', which describe the way to design firms' strategic portfolios of business units and learn to outperform their competitors. The concepts helped to define the firms' objectives and plans within the competitive market, and aroused firms' interests in strategic tools and analysis (Rumelt et al., 1991).

During the 1980s, helped by the previous efforts, strategic management studies flourished in academic growth, along with a gem of work such as Porter's (1985)

industry analysis. The strategic management studies evolved alongside other academic streams during this period, such as economics, organisation theory and finance and accounting. Such academic exchanges facilitated the development of the theoretical foundation of strategic management studies (Barney, 2002). For example, the *evolutionary theory* of economics describes an organisational change through the process of variation, selection and retention among entities within an organisation. When applied to the field of strategic management, the evolutionary theory helps strategic scholars explain the process of formation of effective organisational routine, such as the organisational learning culture or dynamic capability (Nelson and Winter, 1982; Van de Ven and Poole, 1995; Nelson, 1995; Gavetti and Levinthal, 2000).

Economic game theory, which analyses an organisational economic behaviour of which decisions depend very much on other organisations' actions (Camerer, 1991), is another theory adapted by strategic scholars. The use of game theory helps to explain firms' strategic reactions to other organisations which are in an asymmetric competitive market structure (Postrel, 1991). Game theory is also useful in constructing numerous strategic frameworks of organisational behaviours, such as inter-organisational relations, firms' reputation, and entry /exit barriers (Rumelt et al., 1991).

On the other hand, *transaction cost economics*, whose main interest seeks to minimise the cost of exchanging goods or services among firms, is widely used to explain firms' strategic behaviours. For example, the transaction cost theory can clarify the process of firms' strategic decisions on whether to expand the scope of production through inter-organisational co-operation, integration and diversification (Combs, David and Ketchen, 1999). If a firm's production cost is lower than an item's market purchase price (i.e. transaction cost is higher than production cost), firms may choose to internalise the operation process by manufacturing the item themselves. Alternatively, they may choose to cooperate with other firms in the forms of strategic alliance, joint venture and merger and acquisition (M&As) to share the manufacturing cost.

Financing and accounting *agency theory*, which focuses on the business costs of monitoring and controlling a firm's agents, has been used to explain the strategic decisions on firm size, top-management compensation and organisational growth (Rumelt et al., 1991; Combs et al., 1999).

Porter's (1985) approach may be regarded as one of the most influential works in the progress of strategic management academic theory during the 1980s. This approach was instrumental in building up a conceptual framework that describes why some firms outgrow others. As an approach derived from industrial organisation economics, Porter (1985) highlights that the industrial structure where firms operate is central to the firms' supernormal returns. The structural features that facilitate superior returns include (i) high barriers to entry, (ii) low competition, (iii) low-level of powers of both suppliers and customers, and (iv) lesser threats against substitutable goods. Those structural characteristics can make the extent of inter-organisational competition lower, and lessen the negative impact caused by the high negotiation power of suppliers or customers. Consequently, firms that display and practice these characteristics can gain high revenue and numerous advantages. Porter's work is well known as 'the industry structure-conduct-performance model (S-C-P-based model)', and contributed largely to the consolidation of a strategic analysis model that systematically examined the sources of financial outperform. The model also accelerated the development of other useful strategic ideas, such as the value chain model and generic strategic model (Porter, 1985).

However, despite the high contribution of Porter's work to the strategic management field, the model has some serious weaknesses. Most of all, an assumption of the model, which presumes 'an industry' as the unit of analysis, is imperfect. In the model, all the firms in an industry with the favourable industrial conditions are assumed to be at the height of their prosperity. But this assumption fails to acknowledge the differences that will exist between firms, even though they may be in the same industry. In reality, even firms which have the excellent industrial conditions may suffer an inability to gain competitive advantage, while it can sometimes be the case that firms in poor industrial surroundings may be blessed with great financial revenue. Such differences in firms' performance cannot be explained by Porter's model. Thus, an alternative strategic model is needed to investigate the differences in competitive advantages of firms in one industry.

In the 1980s and 1990s, having acknowledged the current limitations of strategic management theory, managers began to focus on the internal capabilities of individual firms, rather than external industrial factors. The attention prompted the advent of the resource-based view (RBV), which is a new perspective on the critical source of sustainable competitive advantage and strategy formulation (Grant, 1996a).

The RBV primarily examines the determinants of a firm's outperformance, and argues that the difference in performance between firms is due, fundamentally, to a firm's heterogeneity, which is in turn derived from the resources that firms own. Thus the unit of analysis in the RBV is the individual firm (Rumelt, 1984; Grant, 1991; Barney, 1991).

Resources can be defined as "stocks of an available factor that are owned or controlled by the firm" (Amit and Schomaker, 1993, p. 35), and "firm resource include all assets, capabilities, competencies, organisational processes, firm attributes, information, knowledge, and so forth, and they enable the firm to conceive of and implement strategies designed to improve its efficiency and effectiveness" (Barney, 2007, p. 133).

The RBV regards firms as a bundle of various resources, and builds on two basic assumptions: (i) resource heterogeneity (i.e. resources of firms are not same) and (ii) resource immobility (i.e. some resources are costly to copy) (Barney, 2007). The RBV suggests that a firm which can manage a productive and unique resource package can gain sustainable competitive advantage. The natures of that resource are 'value', 'rarity', 'inimitability' and 'organisational support' (Rumelt, 1984; Barney, 1991). If a firm's resource enables firms to respond to the current environment (i.e. it is valuable), only a small number of competing firms possess the valuable resource (i.e. it is rare), the resource can not be easily imitated by competitors (i.e. it is inimitable), and organisational policies and procedures support the better use of resource (i.e. there is organisational strong support), the firm may gain a sustainable competitive advantage (Barney, 2007).

Strategic scholars examine several types of firm resources. Grant (1991) classifies firm resources into six major categories: financial resources, physical resources, human resources, technological resources, reputation resources, and organisational resources. Barney (1991) suggests three categories of resources: physical, human and organisational resources. Physical resource refers to a firm's material resource, such as financial capital, technology, plant and equipment. Human resource means the employees' value in a firm, such as the education system in place, personal experience, capability and intelligence. Organisational resource involves inter-personal relationships, coordination, formal organisational structure and the controlling system (Barney, 1991).

Whilst the above classifications reflect on the functional attributes of resources, there is another attempt to categorise resources in terms of their visibility and transferability: tangible and intangible resources. Tangible resource encompasses all the observable assets, e.g. funds, facilities and information systems of a given firm. Intangible resources refer to the assets or organisational competencies which cannot be clearly described and are not easily observed. The intangible resource includes “the intellectual property rights of: patents trademarks, copyright and registered design; contracts, trade secrets and data bases; reputation, know-how and organisational culture” (Hall, 1993, p. 609).

As intangible resources are not easily observed, they are not easily imitated, non-substitutable and hard to copy. Such characteristics help firms to create their own unique identity, and allow them to create a distinctive value (Rumelt, 1984; Barney, 1986, Grant, 1991; Spender, 1996; Liebeskind, 1996). Therefore, numerous scholars have cited the importance of intangible resources in gaining sustainable advantage over peers.

Penrose (1959) initially cited that knowledge resource is arguably the most important intangible resource that firms possess, and effectively managing the knowledge resource contributes to better organisational performance. That recognition has been rapidly expanded and supported by other strategic scholars (Alavi and Leidner, 2001). Such an academic movement brings a new perspective, *the knowledge-based perspective*. The next section will give a comprehensive description for the knowledge-based perspective.

4.3 KNOWLEDGE-BASED PERSPECTIVE

The knowledge-based perspective emphasises distinct characteristics of uniqueness and inimitability of knowledge resource that then support firms’ sustainable competitive advantage. Definition, types, processes and advantages of knowledge and knowledge management are presented in this section.

4.3.1 Definition of Knowledge

In a lexical sense, knowledge is “the sum of what has been learned from experience or study or what is known” (Oxford Paperback Dictionary, 2001, p. 499). The concept of knowledge is widely applied to the social sciences, notably in economics, management theory and organisation theory (Nonaka, 1994). Yet despite a lack of commonly agreed elucidation, this study introduces several commonly used definitions of knowledge made by strategic management scholars. Nonaka (1994) refers to knowledge as “justified true belief” (p. 21), by encompassing a wide range of the nature of knowledge rather than focusing on specific attributes of knowledge. Liebeskind (1996) defines knowledge as follows:

“Knowledge is referred to as information, the validity of which is established through tests of proof. Knowledge can be distinguished from opinion, speculation, beliefs or other types of unproven information” (p. 94).

Liebeskind (1996) highlights the nature of the proven validity of knowledge, but does not differentiate knowledge from information.

Davenport and Prusak (1998) distinguish knowledge from data and information. Data is referred to as “a set of discrete, objective facts about events” (p. 2). Information, in turn, is regarded as “a message in the form of a document or an audible or visible communication” (p. 3). Davenport and Prusak (1998) also define knowledge as:

“...a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knower. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices and norms” (p. 5)

Davenport and Prusak (1998) indicate that knowledge is something which should be imbedded in an individual person or organisation, and cannot therefore be expressed by a simple description with explicit forms like document or visible instruments.

In contrast to Davenport and Prusak (1998), some authors have the explicit forms of information as a part of knowledge. Kogut and Zander (1992) subdivide knowledge into know-how and information. Whilst information is referred to as knowing the specific

meanings of some objects, know-how is about knowing how to do something. Von Hippel (1988) states that know-how is the “accumulated” knowledge that is learned or absorbed by people, which then helps one do something better than when doing without it. Table 4.2 summarises the difference between information and know-how.

Table 4. 2 Comparisons of Know-how and Information

Categories of Knowledge	Main Points	References
<ul style="list-style-type: none"> Know-how 	<ul style="list-style-type: none"> Know-how is related to knowing how to do something. Know-how is accumulated over time and learned by people. Know-how is more likely to be tacit. 	Von Hippel (1988) Kogut and Zander (1992)
<ul style="list-style-type: none"> Information 	<ul style="list-style-type: none"> Information means knowing something’s meaning. Information can be described in the forms of explicit documents and visible instruments. Information is more likely to be explicit. 	Libeskind (1996)

Source: Compiled from various sources.

In summary, as reviewed in some definitions and characteristics of knowledge in the above, knowledge can be understood as knowing (i) what is expressed as visible documents or clear words (i.e. information), and (ii) how to do something which is rooted in invisible routine, culture, practice and experience (i.e. know-how).

4.3.2 Types of Knowledge

Several attempts have been made to classify knowledge in terms of its characteristics or types. A number of scholars divide knowledge into tacit and explicit knowledge in terms of its tacitness. Tacitness is commonly referred to as incommunicability (Polany, 1967), difficulty of codification, abstraction and complexity (Rogers, 1983; Winter, 1987; Boisot, 1995). Table 4.3 summarises the characteristics of tacit and explicit knowledge.

Polany (1967) mentions “we can know more than we can tell” (p. 4), which helps to explain tacit knowledge. He suggests that tacit knowledge is embedded in a person’s brain but is not easily clearly expressed due to its intuitive and unarticulated characteristics. Explicit knowledge encapsulates clear and detailed facts or propositions which have been proven as obviously true or symbols (Kogut and Zander, 1992).

Inkpen and Dinur (1998) regard the attribute of explicit knowledge as codifiability, which can be expressed in manuals or toolkits of computer programs.

Table 4. 3 Types of Knowledge

Knowledge Type	Main Points	References
Tacit Knowledge	<ul style="list-style-type: none"> • Tacit knowledge cannot be clearly written down. • Tacit knowledge places an emphasis on experience skills, practical knowledge, and know-how. • Tacit knowledge is more subjective. 	Polanyi (1967) Nonaka (1994) Nonaka and Takeuchi (1995)
Explicit Knowledge	<ul style="list-style-type: none"> • Explicit knowledge is related to 'knowing about'. • Explicit knowledge can be written down. • Explicit knowledge is more objective. 	Spender (1996a) Grant (1996)

Source: Compiled from various sources.

Grant (1996a) considers '*knowing how*' as tacit knowledge, and '*knowing about objective facts*' as explicit knowledge. Nonaka (1994) states:

“...tacit knowledge has a personal quality, and is difficult to formalise and communicate. On the other hand, explicit or codified knowledge is the knowledge that is transmittable in formal, and systematic language” (p. 16).

Knowledge can be classified as personal and organisational knowledge in terms of the location where knowledge is embedded. *Personal knowledge* applies when the knower is an individual person. Personal knowledge can be distributed and shared between members of an organisation and stocked in the organisation, and sometimes it may be transformed into an organisation's own routine, culture or norm. That form of knowledge embedded within an organisation is referred to as *organisational knowledge* (Cyert and March, 1963; Levitt and March, 1988; Huber, 1991; Berdrow and Lane, 2003).

There is another type of knowledge according to the content of knowledge: market-specific and firm-specific knowledge (Berdrow and Lane, 2003). *Market-specific knowledge* is “organised and structured information about the market” (Li and Calantone, 1998, p. 14). The context of ‘market-specific’ may include the behaviours and needs of customers, competitor's strategies or behaviours, business practices, norms

and artefacts in the market where firms operate. All knowledge pertaining to a particular firm may be market-specific knowledge (Berdrow and Lane, 2003).

Firm-specific knowledge involves a firm's own information or know-how that supports the firm's internal activities (Berdrow and Lane, 2003). Firm-specific knowledge encompasses a certain operational skill or technology in manufacturing, employees' experience or expertise, and organisational know-how or problem-solving mechanisms (Bresman, Birkinshaw and Nobel, 1999; Kogut and Zander, 1992; Ratten and Suseno, 2006).

Having examined and understood the concept of knowledge, the next section then discusses how to manage knowledge resources in order to derive its relevant benefits.

4.3.3 Knowledge Management in Concept

Firms cannot improve their competitive advantage merely by possessing knowledge; rather, they have to *manage the knowledge* to create value by combining knowledge with other assets (Teece, 1998). Knowledge management is referred to as "the conscious and active management of creating, disseminating, evolving and applying knowledge to enhance competitive advantages" (Berdrow and Lane, 2003, p. 15). Alavi and Leidner (2001) acknowledge knowledge management as "identifying, developing and leveraging knowledge in organisations to help them to compete" (p. 113). Teece (1998) suggests that the essence of the knowledge management is in "the firm's ability to create, transfer, assemble, integrate, and exploit knowledge assets" (p. 75).

Knowledge management encompasses the two processes: acquisition/creation and integration/application of knowledge (Spender, 1992; Nonaka, 1994; Grant, 1996a). Table 4.4 describes the main studies on the process.

Acquiring or creating knowledge is the beginning phase of knowledge management. Nonaka and Takeuchi (1995) lay emphasis on the importance of knowledge creation as a key source of firms' innovation. They demonstrate a knowledge creating process which consists of epistemological and ontological levels. The epistemological phase indicates that organisational knowledge is created through individual interaction and

communication, and the ontological level is concerned with the nature of the knowledge of tacitness.

Table 4. 4 Knowledge Management Process

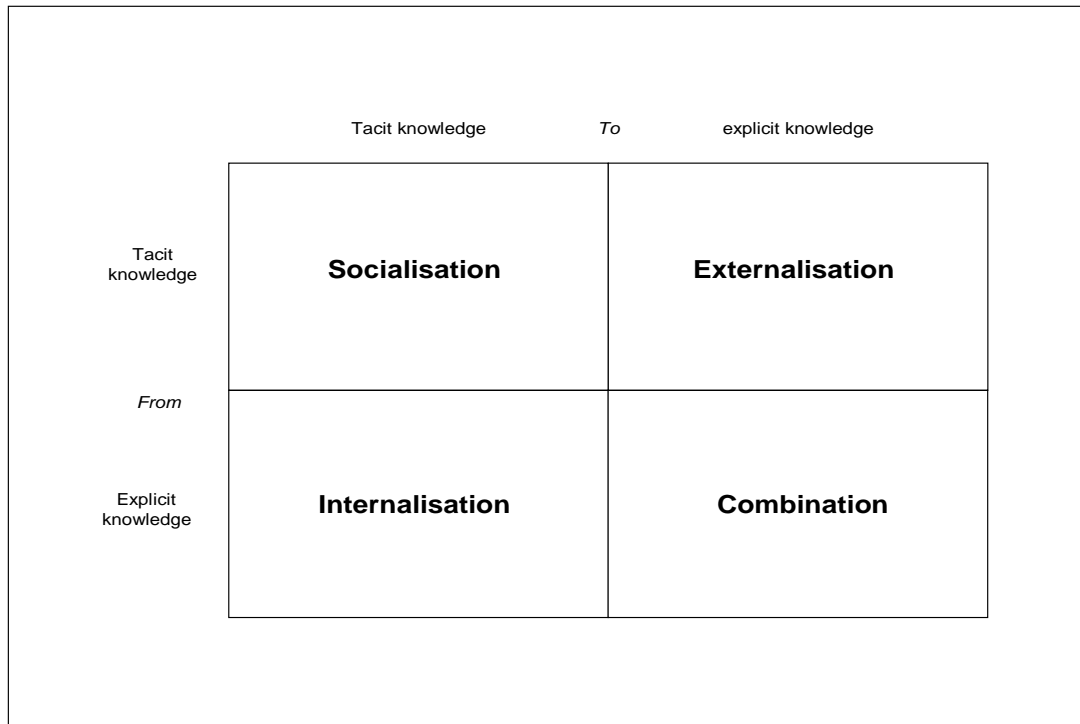
Mechanism	Main Points	References
Knowledge Acquisition/Creation	<ul style="list-style-type: none"> • Organisations acquire knowledge internally and externally. • Organisations create knowledge through reconfiguring existing knowledge or transformations from tacit to explicit knowledge. 	Henderson and Clark (1990) Spender (1994) Nonaka (1994) Simonin (1997) Tsang (2002)
Knowledge Integration/Application	<ul style="list-style-type: none"> • Organisational capability stems from the result of the application of the acquired or the newly created knowledge. • The knowledge application process can be performed through knowledge integration, which is also described as “combinative capability.” 	Cohen and Levinthal (1990) Spender (1994) Kogut and Zander (1992) Grant (1996) Subramaniam and Venkatraman (2001)

Source: Compiled from various sources.

As illustrated in Figure 4.2, knowledge is created through the conversing process between tacit and explicit knowledge (Nonaka and Takeuchi, 1995). Four modes of the conversion, e.g. socialisation, externalisation, combination, and internalisation, are not independent of each other, but through their interactions produce a spiral process as time passes. In the *socialisation* mode, which involves creating knowledge from the tacit to tacit modes, an individual can share and learn tacit knowledge not through language but through observation or practice. The *combination* mode assumes that individuals exchange and combine explicit knowledge through formal/informal meetings or mutual conversations. The individuals are able to reconfigure, or recontextualise the knowledge in this phase.

The *internalisation* and *externalisation* modes of knowledge conversion relate to the conversion of both tacit and explicit knowledge. The externalisation mode is the conversion of explicit knowledge into tacit knowledge, and the internalisation mode is the conversion of explicit knowledge into tacit knowledge through learning. The modes view that tacit and explicit knowledge are not independent but complementary, and can be expanded over time through mutual interaction (Nonaka, 1994).

Figure 4. 2 Four Modes of Knowledge Conversion



Source: Nonaka and Takeuchi (1995, p. 62).

Whilst Nonaka and Takeuchi (1995) can give us an insight into the knowledge creation process, other literature stresses a process of knowledge acquisition or sharing. Tsang (2002) is primarily interested in how firms acquire knowledge from international joint ventures. By using survey responses from Singapore and Hong Kong firms operating in China, he discovers that both overseeing effort and management involvement are crucial determinants of knowledge acquisition from the joint venture partners.

Simonin (1997) stresses the importance of knowledge sharing between strategic alliance partners. According to his study, knowledge, i.e. collaborative know-how in that study, is acquired by inter-organisational collaboration and developed through the experience of collaboration. Consequently, the knowledge acquisition contributes to future collaborative benefits.

Tsai (2001) investigates internal sources of knowledge acquisition/creation within an organisation. He examines the idea that intra-organisational units can learn and acquire knowledge from each other, and that such a process stimulates the creation of new knowledge. Consequently, the newly acquired and created knowledge through learning contributes to the organisational capability to create innovation.

Whilst the above studies mainly discuss knowledge acquisition throughout internal or external routes, other researchers stress the role of knowledge integration/application, which is the next phase of knowledge management in improving organisational performance. Grant (1996) indicates that organisational capability to create value can be facilitated by integrating knowledge. Cohen and Levinthal (1990) point out the importance of an organisational ability to exploit newly acquired knowledge. After acquiring or creating new knowledge, firms should assess the value of the new knowledge, and then properly assimilate and apply it to commercial ends properly. Such organisational ability to assimilate or apply is referred to as “absorptive capacity” (Cohen and Levinthal, 1990).

Subramaniam and Venkatraman (2001) develop a fitness model about the integration and application of newly transferred knowledge. If firms fit new knowledge to their situation, knowledge application effectiveness would be higher, which would then contribute to new product development capability. The relationship between knowledge management and its effectiveness is discussed in more detail in the next section.

4.3.4 Knowledge Management and Competitive Advantage

Knowledge management is an ongoing and complex series of behavioural interactions and processes, so it is not easy to measure the effectiveness of knowledge management on organisational performance simply by viewing particular financial indicators (Berdrow and Lane, 2003). Although firms can gain the strategic benefits of acquiring useful skills or know-how, they may have not yet realised the higher growth of market share or additional financial profits simultaneously. On the other hand, some firms may attain immediate financial advantages through the knowledge management, but may have yet to gain strategic competence (Simmonin, 1997).

Despite the complexity of observing and measuring the benefits of knowledge management, a number of studies have attempted to analyse the effectiveness of knowledge management. This study reviews the literature on the advantages of knowledge management in terms of the two viewpoints: financial and strategic performance. The financial performance refers to how knowledge management can improve a firm’s financial performance, e.g. ROI (return on investment in a particular

year), or the ratio of market share. On the other hand, the strategic performance means the extent to which firms' strategic competitiveness, such as organisational innovation, relative competitive positions, dynamic capabilities, or operational efficiency and flexibility, are enhanced by knowledge management. Table 4.5 summarises existing studies on the relationship between knowledge management and competitive advantage.

Firstly, several attempts have been made to investigate how knowledge management contributes to firms' financial performance. Tsai (2001) examines how knowledge sharing between organisational units affects their financial performance, i.e. ROI in a particular year. The study shows that organisational units can enjoy better financial performance through effective knowledge sharing.

Table 4. 5 Knowledge Management and Competitive Advantage

Categories	Main Points	References
Knowledge Management and Financial Performance	<ul style="list-style-type: none"> Firms can improve the financial performance through managing knowledge effectively. The financial performance indicators include ROA, ROI, business costs, growth rate of sales and so on. 	Autio et al. (2000) Tsai (2001) Zhao et al. (2001) Wu and Chou (2007) Yi-Renfo et al. (2001)
Knowledge Management and Strategic Performance	<ul style="list-style-type: none"> Strategic competitiveness can be improved through effective knowledge management. The strategic performance indicators are managerial efficiency, organisational innovation, flexibility, responsiveness, and new product development 	Nonaka (1990) Grant (1996) Li and Calantone (1998) Tsai (2001) Subramniam and Venkatraman (2001)

Source: Compiled from various sources.

Yi-Rengo, Autio and Sapienza (2001) investigate the positive effectiveness of knowledge acquisition on knowledge application performance, i.e. reduction of business costs and differentiation of organisational technological capability. Autio, Sapienza and Almeida (2000) propound that greater knowledge intensity is associated with faster international growth of firms. They suggest that sales revenue derived from international operations can serve as financial performance indicators of knowledge management.

In the logistics area, Wu and Chou (2007) analyse how positively the knowledge of employees affects firms' logistics performance. They measure the market share of

logistics firms as a financial performance of the knowledge effectiveness. Their empirical result shows that the knowledge has a positive influence on the firms' market share.

Zhao, Droge and Stank (2001) explore whether firms' information-sharing ability can increase logistics performance, such as ROA (return on assets in a particular year) and business costs. However, although the information-sharing does not directly affect the performance in the result, the shared information is positively related to firms' responsiveness and flexibility, which are essential to the successful integration of logistics functions. It can be assumed that the knowledge-sharing may improve a firm's strategic capability, e.g. responsiveness or flexibility in their service.

Like Zhao et al. (2001), there are numerous studies which investigate the effectiveness of knowledge management within the context of a strategic performance (Nonaka, 1990; Grant, 1996a; Li and Calantone, 1998; Tsai, 2001; Subramniam and Venkatraman, 2001).

Grant (1996b) suggests how knowledge integration improves firms' strategic advantage. He postulates that efficiency, breadth and flexibility in integrating knowledge have a positive influence not only on a whole process of transforming from inputs to outputs, but also on the development of the organisational capability to create value.

Sanchez (1996) investigates the claim that knowledge management contributes to the reduction of costs and effective coordination of organisational functions. Consequently, knowledge management enables firms to increase their strategic flexibility, which helps to then respond to environmental change. Tsai (2001) examines the relationship between knowledge management and organisational innovation. He suggests that new knowledge may have a positive influence on firms' innovation, e.g. the number of new products introduced in a unit in a particular year.

The new product development capability has been identified as a significant indicator of the strategic performance of knowledge management (Li and Calatone, 1998; Subramaniam and Venkatraman, 2001; Tsai, 2001). Li and Calatone (1998) analyse the knowledge effectiveness of a software industry and identify where that firms' knowledge improved their competency in new product development.

Subramaniam and Venkatraman (2001) find out that transferring and deploying tacit knowledge of overseas markets facilitates transnational new product development. They measure the transnational new product development capability by (i) the frequency of new product introductions, (ii) the simultaneous entry in multiple markets, (iii) the ability to be responsive to market requirements, (iv) the ability to offer competitive price and (v) the ability to penetrate new overseas markets.

Whilst the knowledge-based perspective focuses on internal sources of firms' superior performance, there is another strategic view that highlights the significance of the inter-organisational resource that exists outside of a firm. Network embeddedness perspective and co-opetitive relationship are the representative views which complement the strategic strengths of RBV and knowledge-based perspective, by focusing on external sources of firms' competitive advantage.

4.4 NETWORK EMBEDDEDNESS PERSPECTIVE

4.4.1 Definition of Social Network

A social network is defined as “a set of nodes among persons or organisations which is linked by a set of social relationships of a specified type” (Laumann, Galaskewicz, and Marsden, 1978, p. 458). Other studies commonly regard a social network as a pattern or way of social relationships among various forms of organisations (e.g. firms or institutions) (Gulati, 1998; Nahapiet and Ghoshal, 1998; Kogut, 2000).

A number of studies identify that a social co-operative network is a crucial resource upon which firms can draw on in the sharing and transferring of knowledge and improvement of strategic performance (Gulati, 1999; McEvily and Zaheer, 1999). The major findings of research on social co-operative networks and their knowledge-based advantages can be summarised by the following two points:

- A social co-operative network facilitates knowledge acquisition among firms, which then contributes to a firm's capability to create a sustainable

competitive advantage (Burt, 1992; Kogut and Zander, 1995; Nahapiet and Ghoshal, 1998; Dyer and Singh, 1998; Gulati, 1998; Tsai and Ghoshal, 1998; Holm, Eriksson and Johanson, 1999; Kogut, 2000).

- The knowledge-based advantages may be affected by a firm's structural and relational position in a social co-operative network (Burt, 1992; Human and Provan, 1997; Powell, Kogut and Smith-Doerr, 1996; Gulati, 1998; Madhavan et al., 1998; Kraatz, 1998; McEvily and Zaheer, 1999; Rowley et al., 2000; Gnyawali and Madhavan, 2001).

Near common consensus agrees that firms can acquire knowledge from a social co-operative network where they are embedded, since the network provides timely chances to get valuable knowledge and resources (Gulati, 1999; McEvily and Zaheer, 1999; Rowley et al., 2000). A different position in a network brings varying opportunities to achieve informational priorities and competitive advantages (Chen and Miller, 1994), a view which is expressed in the *network embeddedness perspective*.

4.4.2 Network Embeddedness Perspective

Strategic behaviours and resource-based advantages of firms within a network may vary according to a firm's position in the network. The various level of network embeddedness causes an asymmetry in accessing resource acquisition across the firms and alters the network-based knowledge advantages, which then leads to different levels of a firm's outcome (Grantovetter, 1985; Burt, 1992; Nohria, 1992; Uzzi, 1997; Gnyawali and Madhavan, 2001). That different informational advantage in a network is explored systemically by a network embeddedness perspective systemically (Marsden, 1981). Network embeddedness perspective indicates two types of mechanisms in order to describe the differential knowledge-based benefits: structural and relational embeddedness (Grantovetter, 1992; Gulati, 1998).

- **Structural Embeddedness**

According to Gulati (1998), structural embeddedness is defined as follows:

“Structural embeddedness or positional perspectives on networks focuses on the informational role of the position an organisation occupies within in the overall structure of the network. Information travels not only through

proximate ties in networks, but through the structure of the network itself” (p. 296).

The structural embeddedness perspective acknowledges that the structure of social network ties creates a number of opportunities to acquire external resources, and a superior structural position in a network enables firms to rapidly share knowledge (Gnyawali and Madhavan, 2001).

The most popular variable of the structural embeddedness is a network ‘*density*’. The network density is referred to as the extent to which the ties among the actors are interconnected in a network. It can be calculated as “the ratio of the number of ties actually observed to the number theoretically possible, thus, the greater the interconnectedness, the higher the density. Thus, a network in which ‘everyone knows everyone else’ is a very dense network” (Granovetter, 1976, p. 1288).

A dense network has a positive impact on actors’ behaviors and outcomes. Firstly, it facilitates faster and more efficient flows of knowledge and enables actors to share and distribute resources with each other through the many interconnections (Coleman, 1990; Valente, 1995). Secondly, behaviours or business habits of actors in a highly dense network can be easily known, since they are well acquainted with each other. That reputation effect may serve as an effective tool to monitor or sanction other firms’ business actions (Granovetter, 1985; Chen and Miller, 1994). Finally, as actors in a dense network interact with each other frequently and closely, they can more easily build up trust, norms, and shared behavioral routine (Colman, 1990). Consequently, an actor in the higher dense network is exposed to a rich flow of knowledge resource and has more opportunities to develop an inter-firm governance mechanism, which leads to enormous informational advantages of the actor.

- **Relational Embeddedness**

Gulati (1998) illustrates relational embeddedness concept as following:

“Relational embeddedness or cohesion perspectives on networks stress the role of direct cohesive ties as a mechanism for gaining fine-grained information. Actors who share direct connections with each other are likely to possess more common information and knowledge of each other” (p. 296).

Literature on network embeddedness highlights tie strength as the most important indicator of relational network embeddedness (Granovetter 1973; Uzzi, 1997; Rowley et al. 2000). Granovetter (1973) defines tie strength as “a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie” (p. 1361). Rowley et al. (2000) refer to tie strength as “the frequency of interaction between partners and their level of resource commitment to the relationship” (p. 371).

Uzzi (1996) suggests several notable benefits of strong ties. Firstly, trust between organisations can be developed by strong network relationships, which then facilitate the exchange of valuable resources and information that are difficult to transfer in the market. Secondly, strong and close ties can promote in-depth and two-way communication. This allows actors to share knowledge that is more proprietary and more tacit (Krackhardt, 1992; Uzzi, 1996). In addition, a strong relationship accelerates social learning among organisations, which can then mitigate environmental uncertainty and enable firms to respond to new environments (Kraatz, 1998). As firms with strong network ties can communicate with each other in a deeper and more open way, they can get more prompt and proper feedback from each other, which helps to effectively and efficiently coordinate the different functions of all the actors. Such routines also enable firms to correct and solve mutual problems more easily. Consequently, the strong tie is positively related to firm performance through the aforementioned benefits (Uzzi, 1997).

Having acknowledged the knowledge-based advantages of the relational and structural network embeddedness, strategic management scholars currently identify co-opetitive inter-organisational relationships as another important source of knowledge acquisition. The co-opetition concept is discussed in the following section.

4.5 CO-OPETITION APPROACH

4.5.1 Definition of Co-opetition

As firms in the present day are faced with dynamically changing business environments, the traditional methods of business survival – intense competition between rivals for personal profit, or the collaboration with rivals to share valuable assets and resources –

are no longer viable options to ensure long-term business sustainability. Instead, firms are enforced to maintain the proper balance between competition and co-operation, in order to mitigate the possible restrictions that may arise when pursuing only one course of action. This multi-pronged approach helps firms to seek new ways of strategic benefits (Bengtsson and Kock, 2000). For instance, competing firms are involved in strategic partnerships in the forms of alliances, joint venture and common marketing arrangement in order to maximise the benefits derived from the simultaneous acts of co-operation and competition (Kogut, 1988). Such strategic relationships have introduced the concept of co-opetition.

Jorde and Teece (1989) initiate co-opetition by noting the following statement:

“Whereas co-operation among firms was once a subject confined to anti-trust case books, it is increasingly a topic for discussion.... Indeed, ways in which firms can ‘cooperate to compete’ are receiving considerable attention” (p. 25).

Co-opetition is referred to as an interdependent relationship in which competition and co-operation simultaneously occur between two or more competitors (Luo, 2004; Tsai, 2002). The main interest of co-opetition is in the advantages of both competition and co-operation. The scope, types and concrete advantages of co-opetition are described in succession.

- **Scope of Co-opetition**

When it comes to an organisational scope of co-opetition, we can identify the relations formed either between firms or between various units/employees within a single firm. For example, Tsai (2002) analyses co-opetitive relationships among business units within an organisation, yet other studies examine inter-organisational co-opetition (Brown and Duguid, 1998).

As far as a structural level is concerned, co-opetition may include horizontal and vertical relations. Brandenburger and Nalebuff (1996) analyse the symmetry between vertical and horizontal co-opetition. Whilst horizontal co-opetition involves the relations with complementors or competitors, the vertical dimension considers the co-opetition between customers and suppliers, which may entail the supply-chain context being complexly linked (Brandenburger and Nalebuff, 1996).

Co-opetitive relationships may be initially formed through dyadic interaction between organisations, which then evolves into multiple inter-connected relations, i.e. co-opetitive networks. The co-opetitive networks may be developed in a global context depending upon today's increasing globalisation of products and markets.

- **Types of Co-opetition**

Several attempts have been made to categorise types of co-opetition with some criterion. Bengtsson and Kock (2000) classify co-opetition into three types according to the extent of competition and co-operation: co-operation-dominated, competition-dominated and equal relations, which are illustrated in Figure 4.3. The co-operation-dominated relationship is one where there is more co-operation than competition; the equal relationship is one where co-operation and competition are the same; and the competitive dominant relationship is where there is more competition than co-operation.

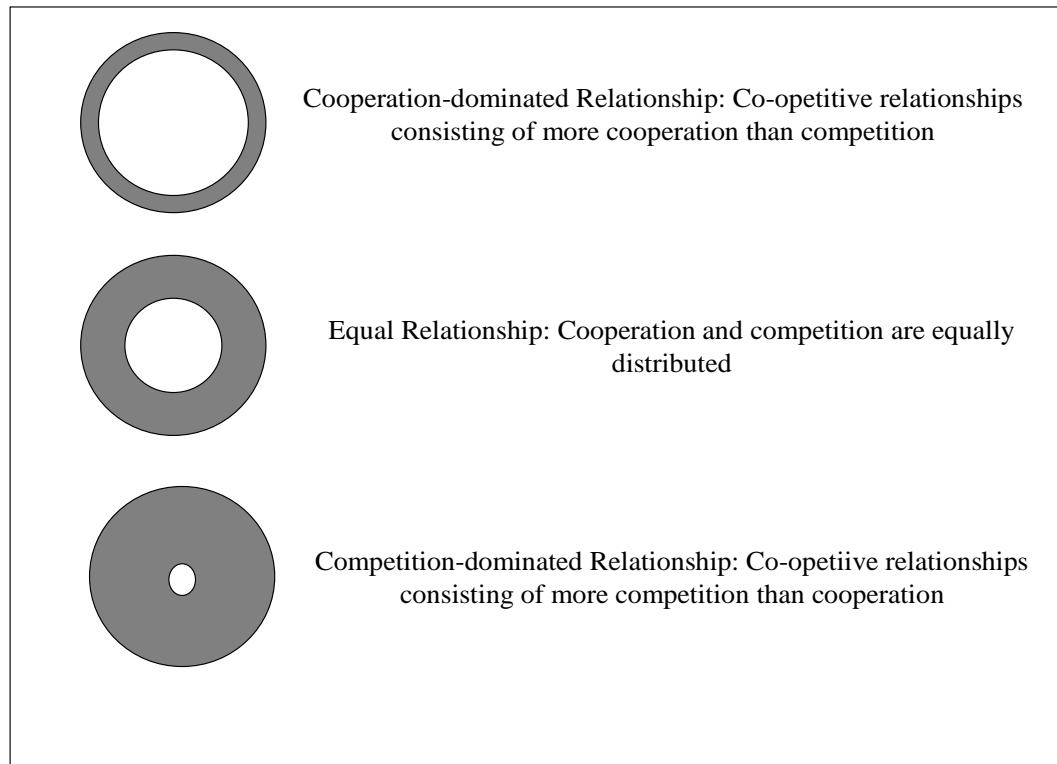
Dowling, Roering, Carllin and Wisnieski (1996) suggest three types of co-opetitive relationships in terms of whether firms are in direct or indirect competition and whether they are partners in competition. Firstly, 'buyer-seller in direct competition' is related to when co-opetitive firms compete with each other directly in their operation, while at the same time supplying one another with their products or services. The second type of co-opetitive relationship occurs if one (or both) firm (s) supply the other with products/services, while at the same time being involved in indirect competition that does not directly relate to their products/services. Such competition is classified as 'buyer-seller in indirect competition.' The final category, referred to as 'partners in competition', is when firms take part in various kinds of collaboration (such as a joint venture, strategic alliance, or licensing agreement) without supplying goods or services to each other.

4.5.2 Advantages of Co-opetition

Co-opetition brings firms a number of advantages through the synthetic mechanism between competition- and co-operation-based relationships. Competition advantages, which mainly focus on developing internal competence to win a business rivalry, derive from a firm's specific assets, know-how, and organisational capability. On the other hand, co-operation advantages rest on integrating complementary resources

through collaboration with partners, customers, suppliers, and competitors (M'Chirgui, 2005; Dagnino, 2007; Padula and Dagnino, 2007).

Figure 4. 3 Different Types of Co-opetitive Relationships between Competitors



Source: Bengtsson and Kock (2000, p. 416).

• **Competition Advantages**

Strategic management scholars indicate that intensive competition drives price reduction and fosters greater innovation of firms, which then allows firms to gain competitive advantage over other firms (Padula and Dagnino, 2007). They also argue that organisational capabilities can advance considerably when inter-firm competition is high, because it encourages firms to focus more on their idiosyncratic competitiveness, unique or hard-to-imitate competencies and organisational innovation (Porter, 1985; Barney, 1991; Rumelt, 1984; Padula and Dagnino, 2007).

• **Co-operation Advantages**

Inter-firm co-operation is addressed as a complementary weapon of fierce competition (Powell et al. 1996). Co-operation allows competing firms to exchange and combine

together complementary assets, resources and know-how for mutual benefit. Co-operation also promotes inter-organisational learning, collective protection against risks or uncertainties associated with environmental challenge and operational innovation (Luo, 2004). Such collaborative behaviour also mitigates mutually destructive competition among parties (Song, 2003), and helps to ensure that co-operating firms can improve their competitive advantages and their performance to survive in complex business environments (Teece, 1989).

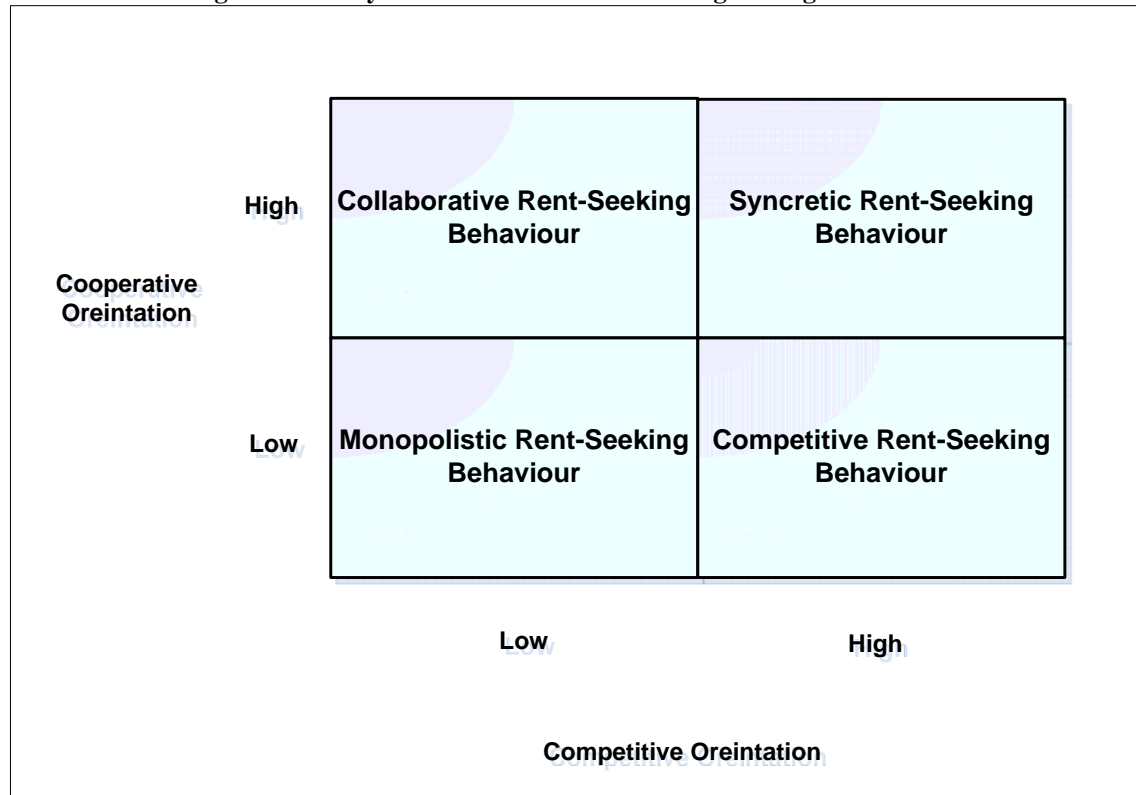
- **Co-opetition Advantages**

Despite numerous advantages of the two discrete strategies, carrying on with them separately may have several limitations. For instance, the competition paradigm may pay little attention to win-win benefits which can be gained by collaborating among competing firms (Brandenburger and Nalebuff, 1995). And focusing solely on co-operation may cause some risks of opportunistic behaviours of co-operating parties (Padula nad Dagnino, 2007). In this respect, co-opetition could solve the biased problems by pursuing the combinative advantages of both strategies.

There are a number of studies that acknowledge the knowledge- or learning- based co-opetitive advantages. Lado, Boyd and Nalón (1997) develop a four-cell typology of rent-seeking strategic behaviour according to the extent of competition and co-operation, as shown in Figure 4.4. They suggest that co-opetition (i.e. the cell of syncretic rent-seeking behaviour) promotes excellent knowledge acquisition and creation and enables firms to enhance the competitive position of firms by developing mutual idiosyncratic competencies and reducing firms' cost and risk, rather than other types of rent-seeking behaviours.

According to Tsai (2002), co-opetition allows multi-directional learning through co-operation, and the development of internal resources and external market shares through competition. Thus, it is assumed that co-opetition facilitates inter-organisational learning and knowledge sharing, which may help to enhance firms' performance by improving organisational efficiency and effectiveness.

Figure 4. 4 A Syncretic Model of Rent-Seeking Strategic Behaviour



Source: Lado et al. (1997, p. 119).

There exist other significant advantages which are drawn from the co-opetitive relationship. Bengtsson and Kock (2000) analyse several benefits of co-opetition in the Swedish and Finnish brewery industry: (i) cost of new product development can be saved by dividing it among the co-operating companies, (ii) lead time can be reduced, and consequently, (iii) the co-opetition contributes to the improvement of the firms' core competence.

4.5.3 Co-opetition in Practice

Co-opetitive strategy of firms has been identified in both manufacturing and service industries (Bengtsson and kock, 2000; M'Chirgui, 2005; Bonel and Rocco, 2007; Mariani, 2007; Okura, 2007).

- **Co-opetition in Manufacturing Industries**

Bengtsson and Kock (2000) examine co-opetition by conducting an explorative case study in the lining, brewery and dairy industries. They analyse how the competitive and

co-operative relationship could be divided and managed depending upon the distance to firms' buyers. The result of the case study shows that firms in the three industries examined are more likely to cooperate at a greater distance from buyers, and to compete at a closer distance to buyers. Firms are more prone to sharing competitors' resources through co-operation before launching their final goods in the market. But they are more likely to compete intensively at the output market in order to gain the higher market share or sales growth (Bengtsson and Kock, 2000).

M'Chirgui (2005) analyses co-opetition strategy in a smart card industry. He points out that firms could gain a competitive advantage by integrating complementary assets and know-how through collaboration with competitors in the industry. He conducts an explorative case study of the smart card industry, and shows that the co-opetition between smart card actors creates opportunities to foster market growth for new smart card applications.

Bonel and Rocco (2007) examine the co-opetition strategy in a soft drinks and beverages industry in Italy. They analyse a case of San Benedetto Spa, an Italian drinks and bottling company which pursues the co-opetition strategy with big competitors – i.e. Coca-Cola and Pepsi Co. – in order to survive in the matured industry. The study highlights co-opetition advantages, which enable firms to share competitors' technical superiority and to capitalise on their competitor's high levels of quality and technology.

• **Co-opetition in Service Industries**

Mariani (2007) provides empirical evidence of co-opetition from an Italian consortium of opera houses. An in-depth case study on a renowned consortium of Italian opera houses elucidates the role of co-opetitive strategies to trigger strategic learning among competitors. According to his study, competition strategies are identified in three types of activities: (i) upstream competition (financing activity), (ii) midstream competition (production activity), and (iii) downstream competition (marketing activity). Co-operation between opera houses also occurs, in order to gain the economic benefits of sharing (i) costs associated with coproduced scenery sets (e.g. costs for raw material and carpentry), (ii) personnel costs of artistic ensemble (e.g. orchestra and chorus), and (iii) costs of the singers' artistic cachet. Co-opetition thus incrementally emerges through the competitive and co-operative behaviours. As time passes, the competition induces the co-operation of the opera houses to save the costs, and consequently it triggers

simultaneous competitive and co-operative behaviours, which is an initiation stage of a co-opetitive strategy.

Okura (2007) examines how co-opetition affects the strategy of Japanese insurance firms. He mentions that the Japanese insurance market is co-opetitive, since the insurance firms, through joining the insurance association, cooperate in an investment phase aimed at reducing the probability of accidents, while at the same time they compete with each other in a sales phase.

With the above referred points in mind, it is expected that co-opetition is popular both in manufacturing and service industries. It offers a significant strategic alternative for achieving resource (i.e. especially knowledge) sharing advantages, pursuing win-win benefits, reducing business costs, developing internal capability and mitigating the risks of opportunistic behaviours.

4.6 KNOWLEDGE-BASED PERSPECTIVE FOR MARITIME LOGISTICS VALUE

4.6.1 Importance of Knowledge Acquisition in Maritime Logistics

Some key theories and practices in strategic management were elaborated on in the previous sections. Such a literature review may give us a comprehensive understanding of the central academic stream in strategic management, and help us to evaluate which theory or practice can be adopted for maritime operators' strategic solutions. However, "there is no single, multipurpose theory of the firm, and every theory of the firm is an abstraction of the real-world business enterprise which is designed to address a particular set of its characteristics and behaviours" (Grant, 1996a, p. 109). Thus, when choosing the theory or practice for maritime operators, one should first and foremost consider whether the theory best explains the way to improve maritime logistics value.

The central factors of maritime logistics value are operational efficiency and service effectiveness. In order to choose the appropriate theory for maritime business strategy, one should consider most significantly the strategic works which appeared during and after the 1980s, when the academic development began to flourish in earnest. In the 1980s, there were prominent strategic management works such as Porter's (1985)

industry analysis, and other derivative theories, i.e. evolutionary theory, transaction cost economics, game theory and agency theory. Those theories focus more on the external environment of firms, which enables the firm outperform to others; or on firms' economic behaviours, which let them make the best decisions in co-operation, diversification, top management compensation, and strategic reaction to other firms. Despite the high contribution to strategic management studies, those theories may not comprehensively explain how to enhance firms' operational efficiency and service effectiveness.

On the one hand, the RBV, which was the dominant theory in the 1990s, primarily argues the source of sustainable competitive advantages of a firm. The RBV views that firm resources help firms to improve their efficiency and effectiveness by creating a firm's heterogeneity or uniqueness through the best usage of the resources (Barney, 2007). In this sense, the RBV may give a strategic solution to maritime operators. However, the RBV stresses the significance of intangible resources as a determinant of firms' sustainable competitive advantage, rather than precisely defining the mechanism of which certain intangible resource would have a positive influence on the operational efficiency and service effectiveness.

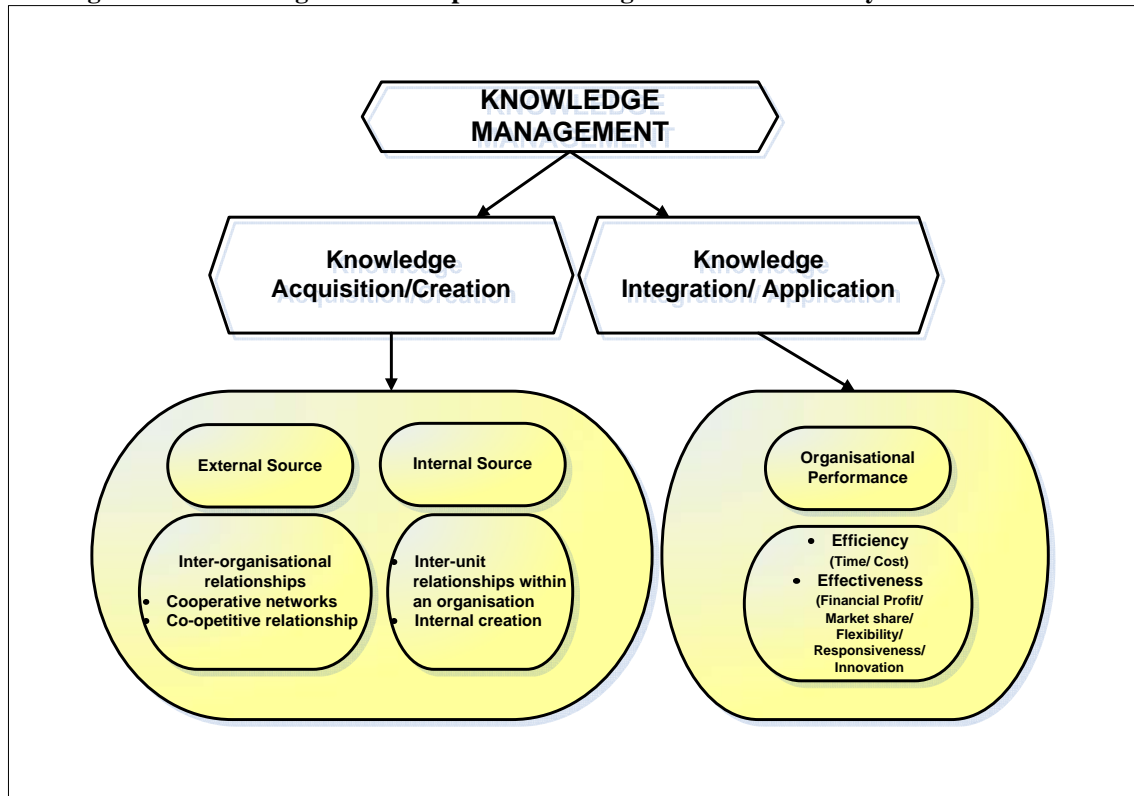
The knowledge-based perspective, which is an outgrowth of the RBV rather than a substitutable view of the RBV (Grant, 1996a), can cover the aforementioned restraint which the RBV could not clearly provide. As seen in the existing literatures, knowledge is the most strategically important of the firm's resources, and successful knowledge management is central to enhance organisational efficiency and effectiveness, i.e. reducing business costs and operation time, and improving firms' flexibility, responsiveness and innovation, as depicted in Figure 4.5 (Nonaka, 1990; Grant, 1996a; Li and Calantone, 1998; Autio et al., 2000; Tsai, 2001; Zhao et al., 2001; Wu and Chou, 2007; Subramniam and Venkatraman, 2001).

Several earlier studies in logistics and maritime transportation also stress the importance of knowledge management in improving firms' performance such as organisational efficiency and effectiveness.

Esper, Fugate and Davis-Sramek (2007) recognise that organisational learning and knowledge acquisition may help firms to better learn new logistics operations or key

functions, and thus this consequently enables firms to flexibly respond to external changes and be easily integrated into the whole logistics system.

Figure 4. 5 Knowledge-based Perspective and Organisational Efficiency and Effectiveness



Source: Drawn by the author.

Panayides (2007) investigates the positive influence of knowledge acquisition on the performance of third-party logistics firms. Panayides (2007) postulates that the knowledge acquisition of third-party logistics firms affects the relationship orientation and logistics service quality of a firm, which then in turn has a positive influence on the firm's performance. With these positive empirical findings, he then concludes that logistics managers have to persevere in their efforts to develop organisational learning capability, in order to enhance logistics firms' performance.

Hult, Ketchen and Arrfelt (2007) empirically analyse the relationship between a culture of competitiveness (i.e. learning orientation, innovativeness orientation and entrepreneurial orientation), knowledge development (i.e. knowledge acquisition, information distribution, shared meaning and achieved memory) and performance in

supply chains (i.e. reducing lead time). They find a positive interaction effect between a culture of competitiveness and knowledge development on supply chain performance.

Christensen, Germain and Birou (2005) examine the influence of supply chain knowledge acquisition (from both the supplier and customer side) on market performance in supply chain business. The results show that the application of supply chain knowledge positively affects market performance.

The above studies investigate the effectiveness of knowledge management in improving organisational efficiency and effectiveness in logistics and supply chain management. Therefore, those findings may verify and support the theoretical assumption about the positive relationship between knowledge-based strategy and maritime logistics value, since a maritime operator that provides maritime logistics services falls into the logistics firm category.

Today's maritime operators operate in a highly volatile environment. The increase in customer power, the global expansion of port operators and shipping lines in scope and size, intense competition and world-wide financial crisis are good examples of the challenges that the current business environment presents. Under the dynamics of this environment, maritime operators are forced to play a significant part as an integrated logistics component, thus they should make decisions that are strategically very important and complex, in order to reduce the environmental uncertainty and at the same time improve maritime logistics value.

As it was briefly suggested during the discussion of the benefits of the strategy, an effective knowledge acquisition would offer a useful strategic solution to maritime operators. By collecting valuable information about their suppliers, customers, co-operative partners and business environments, maritime operators can mitigate the uncertainty of their business environment and learn new business patterns of the industry. This may allow maritime operators to respond more easily to the customer demands. Having the useful information/knowledge at the right time and place may promote the more responsive and flexible services (Naim, Potter, Mason and Bateman, 2006). In addition, as maritime operators constantly interface with external entities in a logistics chain, if they promptly capture new knowledge from other entities and absorb

the knowledge, they can be more effectively coordinated into the chain with the external actors (Esper, Fugate and Davis-Sramek, 2007).

The importance of knowledge-based strategy for maritime logistics value can also be justified in terms of the types of industry: i.e. goods-dominant industry and service-dominant industry. Generally, in a goods-dominant industry, value is created from tangible goods which are produced by the manufacturing process. Thus, the tangible asset makes up a significant portion of a firm's value. On the contrary, in a service-dominant industry, value is created from the organisational capability of the usage of resources or goods. Therefore, such industry is more invisible and intellectual capital-intensive (Vargo, Maglio and Akaka, 2008). In the service-dominant industry, a firm must combine and coordinate all of its resources and different operations in order to create higher value (Vargo et al., 2008). Such activities can be accelerated by leveraging knowledge, skills and the experiences of human resources, i.e. effective knowledge management. The maritime logistics industry may be characterised by being service-dominant, since a maritime logistics system provides customers with transport-related intangible services such as moving, handling and storing cargoes, rather than producing certain tangible goods. Thus a successful knowledge management may be essential to the maritime logistics industry. In this sense, this study follows the knowledge-based perspective to explore the strategic solution to enhance maritime logistics value.

4.6.2 Types of Knowledge for Maritime Logistics Value

Knowledge in this study is defined as 'useful information or know-how for maritime logistics value', based on the earlier studies. In the previous section in this chapter, several types of knowledge are introduced by business scholars, such as explicit and tacit knowledge, personal and organisational knowledge, and market- and firm-specific knowledge.

This study categorises maritime logistics knowledge into two types: (i) market-specific knowledge, and (ii) firm-specific knowledge. This draws upon Berdrow and Lane's work (2003), which encompasses a wide range of attributes of knowledge that are needed to operate in a global business environment. Today's maritime logistics operators are regarded as typical international firms, which rapidly extend their scope

and size into world-wide global markets. Thus, they need the following two types of knowledge:

Market-specific knowledge for maritime logistics value refers to useful information and know-how of the industry and market. This type of knowledge would entail the following: (i) general information about maritime transport industry, e.g. new trends, business culture or practice of the market, and governmental regulations of the industry; (ii) customer demands on a firm's service; and (iii) strategy and behaviour of competitors.

Firm-specific knowledge for maritime logistics value encompasses a certain operational technology, employees' experience and expertise, and organisational know-how about practices or procedures. Such types of knowledge may include: (i) operational skills or information technology, such as managerial information systems, process reengineering systems, and just-in-time or lean systems; (ii) overall skills of managing employee and organisation, such as employee education or training; and (iii) marketing related know-how, e.g. promotion, price, distribution and customer relationship management.

Those two types of knowledge may help maritime operators to adapt themselves to a new business environment, and learn innovative business skills and practice. This, in turn, will lead to the refinement of their competitive capabilities.

4.6.3 Inter-organisational Relationship for Knowledge Acquisition in Maritime Logistics

In relation to the way to acquire knowledge, the previous studies provide the two channels of knowledge acquisition/creation: externally acquired or internally created (Nonaka and Takeuchi, 1995; Simonin, 1997; Tsai, 2001). As the first step of adaptation of the knowledge management strategy, this study does not cover all the sources of knowledge acquisition/creation, rather it focuses solely on the external source of knowledge acquisition of maritime operators. This is based on the previous findings which have addressed that inter-organisational learning would be a more preferable way to successfully acquire knowledge (Burt, 1992; Kogut and Zander, 1995; Nahapiet and Ghoshal, 1998; Dyer and Singh, 1998; Gulati, 1998; Tsai and Ghoshal, 1998; Holm,

Eriksson and Johanson, 1999; Kogut, 2000). Ratten and Suseno (2006) highlight the significance of inter-organisational learning by stating that “the nature of organisations as social communities further encourages this tendency for organisations to learn from their partners, customer, suppliers and competitors; and they can quickly jump onto the bandwagon of other firms’ experience, making the learning process more efficient and effective” (p. 60).

Several forms of inter-organisational relationships which facilitate the transfer of knowledge between organisations have been addressed in previous studies. For example, inter-organisational co-operation in the forms of strategic alliances or joint ventures has shed light on the significance of promoting knowledge acquisition between organisations (Kogut, 1988; Mowery, Oxley and Silverman, 1996; Inkpen and Dinur, 1998; Almeida, Song and Grant, 2002; Tsang, 2002; Bedrow and Lane, 2003; Ratten and Suseno, 2006). However, strategic alliances or joint ventures can explain only the dyadic relationship between organisations (Gulati, 1998). In reality, most firms do not have only independent dyadic relationships, but are engaged in multiple and complex relationships directly or indirectly through the building up of social co-operative networks (Madhavan, Koka and Prescott, 1998; Holm, Eriksson and Johanson, 1999).

Strategic literatures have identified that a social co-operative network plays a vital role in sharing knowledge between firms (Gulati, 1999; McEvily and Zaheer, 1999; Rowley, Behrens and Krackhardt, 2000). In this sense, this thesis considers the co-operative networks as the first source of knowledge acquisition of maritime operators.

Like all other business organisations, maritime operators work by being embedded in both horizontal and vertical levels of business networks. The horizontal level of a network consists of the players in the same business, and the vertical being interconnected to each other in the different stages in a logistics. This thesis considers the horizontal level of networks of maritime operators as being the source of knowledge acquisition for maritime transport/terminal operators, being based on previous findings that note the effectiveness of inter-organisational learning in the same business (Gulati, 1998; Capaldo, 2007).

As maritime operators globally extend their business scope and scale example, their world-wide co-operative network has become bigger and more complex, and a player’s

strategic behaviours may affect all other players' strategic decisions in both direct and indirect manners. The co-operation may include both forms of formal such as strategic alliances, joint ventures, associations and consortium and various types of informal relations such as personal meetings, phoning or emails, and any other co-operative relations which are not contract-based. The greater the numbers of co-operative ties maritime operators have, the more exposed they are to knowledge flows, and the greater the access they have to these knowledge flows. As a result, they can share more knowledge about the industry, market, or the firms' own technology. Thus, high numbers of network ties are likely to lead to a player having a higher volume and speed of knowledge acquisition (Galaskiewicz, 1979).

The strength of ties may also affect the knowledge acquisition of maritime operators. The strong relationships with other players in a co-operative network can promote in-depth, two way communication, and facilitate the exchange of solid information between organisations (Krackhardt, 1992; Uzzi, 1997; Kraatz, 1998). If inter-organisational interactions become both closer and more frequent, they could accumulate mutual trust. Such trust could make them more open and able to control the opportunistic activities among organisations. As a result, maritime operators with strong ties are more likely to share valuable information and know-how with one another.

As discussed in the previous section in this chapter, there is another contention to complement the relationship between co-operative networks and knowledge acquisition: inter-organisational competition in a network facilitates the inter-organisational learning in a co-operative network (Tsai, 2002). The competition per se may harm inter-organisational learning, since intensively competing firms hesitate to open their resource to their competitors. However, the competition between co-operating firms could help inter-organisational knowledge sharing, since the firms may be affected by the governance mechanisms of co-operative network relationship such as mutual gain, reciprocity and reputation effect (Coleman, 1988; Powell, 1990; Jones, Hesterly and Borgatti, 1997).

Network governance mechanism is referred to as "a social mechanism – rather than authority, bureaucratic rules, standardization, or legal resource – that facilitates monitoring, coordinating, and safeguarding inter-organisational exchanges of resources or information" (Jones et al., 1997, p. 917). Those mechanisms may force the actors to

share knowledge with other partners or sometimes with direct competitors, so that they may maximise common interests in the network. Thus, competing players in a co-operative network tend to follow such a social mechanism, lest they have disadvantages due to the nonobservance of the social mechanism.

For example, if a maritime operator competes intensively with one another, the firm may be more enthusiastic to acquire the knowledge of their competitors, as the competition may stimulate the desire to acquire the knowledge of other competitors. Since the firm's competitors in a co-operative network are forced to follow the social governance mechanism, the competitors could not completely protect their knowledge. Rather, they may have to open their knowledge as much as they wish to acquire others' knowledge. This may lead to vigorous knowledge exchange between competitors under a co-operative relationship. Consequently, the competition promotes mutual knowledge sharing with the highly co-operative partners (Gulati and Singh, 1999; Tsai, 2002).

Such a positive interaction effect between co-operation and competition is referred to as "co-opetition". A great number of studies stress the knowledge- or learning- based co-opetitive advantages. Lado, Boyd and Nalón (1997) suggest that co-opetition promotes excellent knowledge acquisition, and enables firms to enhance the competitive position of firms by developing mutual idiosyncratic competencies and reducing firms' cost and risk. Tsai (2002) indicates that co-opetition allows multi-directional learning and knowledge sharing of organisations, which in turn may help to enhance firms' performance by improving their organisational efficiency and effectiveness. Bernal, Burr and Johnson (2002) also suggest that freight forwarders make good use of their co-opetitive networks in order to share valuable resources. Therefore, it can be expected that the co-opetition in the network among maritime operators could promote knowledge acquisition. In this sense, the co-opetition in the network can be considered as the second source of knowledge acquisition of maritime operators.

4.7 SUMMARY

This chapter reviews theoretical literature on a strategic management field in order to seek out desirable strategies for maritime logistics value. Some important strategic theories/perspectives (i.e. industrial structural model, resource-based view, knowledge-

based perspective, network embeddedness perspective and co-opetition strategy) were evaluated and compared. Much of the work takes the shared concern for the importance of knowledge resource in gaining firms competitive advantage, i.e. organisational efficiency and effectiveness. Relational and structural embeddedness in social networks could explain the way to gain and transfer knowledge between firms. In addition, current studies address the importance of co-opetition as a new mechanism for knowledge sharing, as it allows firms to benefit from simultaneous competition and co-operation.

The overview may provide a significant strategic insight for the strategic direction of maritime operators, who are facing environmental challenges and are enforced to enhance maritime logistics value. The demands on high levels of efficient logistics integration may force maritime operators to contain and share valuable knowledge with each other. In this sense, making better use of knowledge can support the requirements of maritime operators. Therefore, knowledge-based strategy may answer the current strategic task of maritime operators. The next chapter will develop a conceptual framework to propose strategic solutions for maritime logistics operators by dealing with the mechanism about knowledge management for maritime logistics value.

CHAPTER 5 RESEARCH METHODOLOGY

5.1 INTRODUCTION

This chapter examines aspects of the research methodology employed in this thesis. Generally speaking, a business research can be divided into the following main elements: selecting a topic; reviewing the literature; deciding on research questions and research objectives; devising a conceptual framework; choosing a research method; conducting field research; and deriving the implication and the conclusion.

The previous chapters reviewed the theoretical literature on this thesis topic, i.e. maritime logistics, maritime logistics value, and strategic management theory. A research gap between the existing literature and the current research stream was identified, and central theories and practices to be applied to this study were illustrated. Following on from this process of literature review, this chapter will endeavour to complete the following: to address the research questions and objectives which were derived from the review of the current literature on the topic; to develop a theoretical conceptual framework by exploring the relationship between key concepts and theories on the topic; to discuss methodological issues of research i.e. the philosophy, logic and method of research; to choose and justify an appropriate research method for this study; to design an analytical process for this study; and to assess the validity and reliability of the chosen research method.

5.2 RESEARCH QUESTIONS AND OBJECTIVES

This thesis aims to propose a new strategic direction for maritime operators, who are currently struggling to cope with a dynamically changing business environment. As reviewed in Chapter 2, maritime transportation has traditionally played a key part in reducing transportation costs, and therefore has managed to maintain cost effective pricing. However, the challenges of the current business environment have caused the maritime transport system to be viewed in a different way. Rather than viewing it as an entity whose sole function is to provide low cost sea transportation, the current business environment views the maritime transport system as a significant logistical component,

offering multiple logistics services (e.g. warehousing, packaging, and connecting inland transportation) and adding value to the whole logistics flows, in addition to its traditional role of cost effective transportation. Thus maritime transport is not an independent but rather a dependent entity, systematically connected to other components across the whole logistics.

Such recognition contributes to the advent of the *maritime logistics* concept. Maritime logistics stresses the integrated role of maritime operators by offering quick, responsive, flexible and reliable services at a lower price. Such merits created by maritime operators are referred to as *maritime logistics value*, which has become one of the most important managerial considerations for maritime operators. As it is vital to their sustainability and survival in the industry, the improvement of maritime logistics value becomes a significant strategic objective for today's maritime operators. The described development about the new role of maritime operators and the newly addressed strategic goals are summarised in Table 5.1.

Table 5. 1 Comparison of Traditional and Recent Maritime Operators

	Traditional Maritime Operators	Recent Maritime Operators
Main Functions	Sea transportation	Sea Transportation Offering multiple logistics services
Characteristics	Independent	Systematically integrated component of global logistics flow
Strategic Objectives	Low cost and price	Enhancing maritime logistics value <ul style="list-style-type: none"> • Low cost/price • Quick time • Responsiveness • Flexibility • Reliability

Source: Summarised by the author.

The increasing attention paid to the above trend has facilitated a number of studies on the maritime transportation industry. They include:

- (i) the determinants of successful integration of maritime transport into global logistics, and its effectiveness (Bowersox, 1978; Narasimhan and Jayaram, 1998; O'Leary-Kelly and Flores, 2002; Panayides and Song, 2008),
- (ii) the importance of maritime logistics (Panayides, 2006),

- (iii) the strategic alliance strategy of shipping and port to improve operational efficiency by reducing transport cost (Frankel, 1982; Brooks, 2000),
- (iv) the efficiency and competitiveness of port/terminal (Ciullinane, Song and Gray, 2002; Tongzon and Wu, 2005; Yeo and Song, 2006), and
- (v) the safety, security and environment in maritime transport to manage accidents or risks (Gaarder et al., 1997; Soares and Teizeira, 2001; Roe, 2007; Li and Zheng, 2008).

Despite the fact that these studies acknowledge the strategic significance of maritime transport within the context of global logistics, they have not yet clarified a strategic solution on how to improve maritime logistics value from a strategic management perspective in a systematic manner. The reason for this slow progression of academic thought may be due to the fact that this movement to the maritime strategy only began in earnest in the late 1990s.

In order to compensate for the gap in the systematic approach on maritime logistics strategy, this study has broadly reviewed the related strategic literature which guides the way to improve operational efficiency and service effectiveness. From this, this study has discovered a desirable strategic practice for maritime logistics value: i.e. knowledge-based strategy, which is regarded as one of the most influential strategies for firms' competitive advantage (i.e. organisational efficiency and effectiveness). Generally, knowledge management consists of the two parts of the process: knowledge acquisition and application (Nonaka, 1994; Spender, 1992). Firms can acquire knowledge through internal or external routes, and organisations then integrate and apply the knowledge in order to create value. Firms can achieve knowledge-based benefits through effectively managing such repetitive and productive processes. The key advantages of knowledge management have been known to be that (i) knowledge can create the uniqueness which allows for difficulty in imitating a firm, and promote operational efficiency/productivity and high customer-service quality, which then leads to firms' growth and higher profits, and (ii) firms can create powerful organisational competence for innovation as well as dynamic capability by protecting and managing the firms' own knowledge (Grant, 1996; Teece, 1998).

Through examining the current literature, it has been identified that knowledge-based strategy would help to maximise maritime logistics value. However, despite the fact that

a number of attempts to address the organisational effectiveness of knowledge management have been made by logistics scholars, a systematic approach which examines the way to apply the knowledge management strategy to maritime operations has been relatively neglected. Having recognised such a research gap, this thesis aims to examine the more practical ways of systemically applying a knowledge management strategy to maritime operators, namely, the ways in which maritime operators could acquire knowledge in order to achieve their strategic goals; and to diagnose the effectiveness of the knowledge acquisition for maritime logistics value. To be more specific, this thesis examines (i) how maritime operators could acquire this useful knowledge (i.e. sources of knowledge acquisition), (ii) how effective the application of the acquired knowledge is in improving maritime logistics value, and as a result, is knowledge management strategy a desirable strategic alternative for maritime operators to improve maritime logistics value? Thus this work generates the following two research questions (RQ):

RQ1: *How could maritime operators acquire the knowledge for maritime logistics value?*

RQ2: *How could the acquired knowledge improve maritime logistics value, and is knowledge management strategy a desirable strategic alternative for maritime operators, in order for them to improve maritime logistics value?*

Table 5. 2 Research Objectives and Research Questions

Research Objective	
<ul style="list-style-type: none"> • To apply a knowledge management strategy to maritime operations • To diagnose the effectiveness of knowledge management strategy for maritime logistics value 	
Research Questions (RQ)	
<i>RQ1</i>	<i>How could maritime operators acquire the knowledge for maritime logistics value?</i>
<i>RQ2</i>	<i>How could the acquired knowledge improve the maritime logistics value, and is knowledge management strategy a desirable strategic alternative for maritime operators, in order for them to improve maritime logistics value?</i>

These research objectives and research questions are summarised in Table 5.2. Such an attempt may help us to understand whether a knowledge management strategy would be

a desirable strategic option to achieve today's strategic goal of maritime operators. The next section then develops a conceptual framework which explores and theoretically investigates a knowledge management process for maritime logistics value.

5.3 CONCEPTUAL FRAMEWORK

In order to answer the aforementioned research questions, this research develops a conceptual model by linking theories and practices of knowledge management to the maritime logistics business. Several relevant strategic management theories, such as knowledge-based perspective, a social network theory and co-opetition strategy, and maritime logistics literatures were reviewed for the development of a conceptual framework. This section examines sources of knowledge acquisition for maritime operators, and finally, and discusses its effectiveness in improving maritime logistics value. The conceptual model is depicted in Figure 5.1.

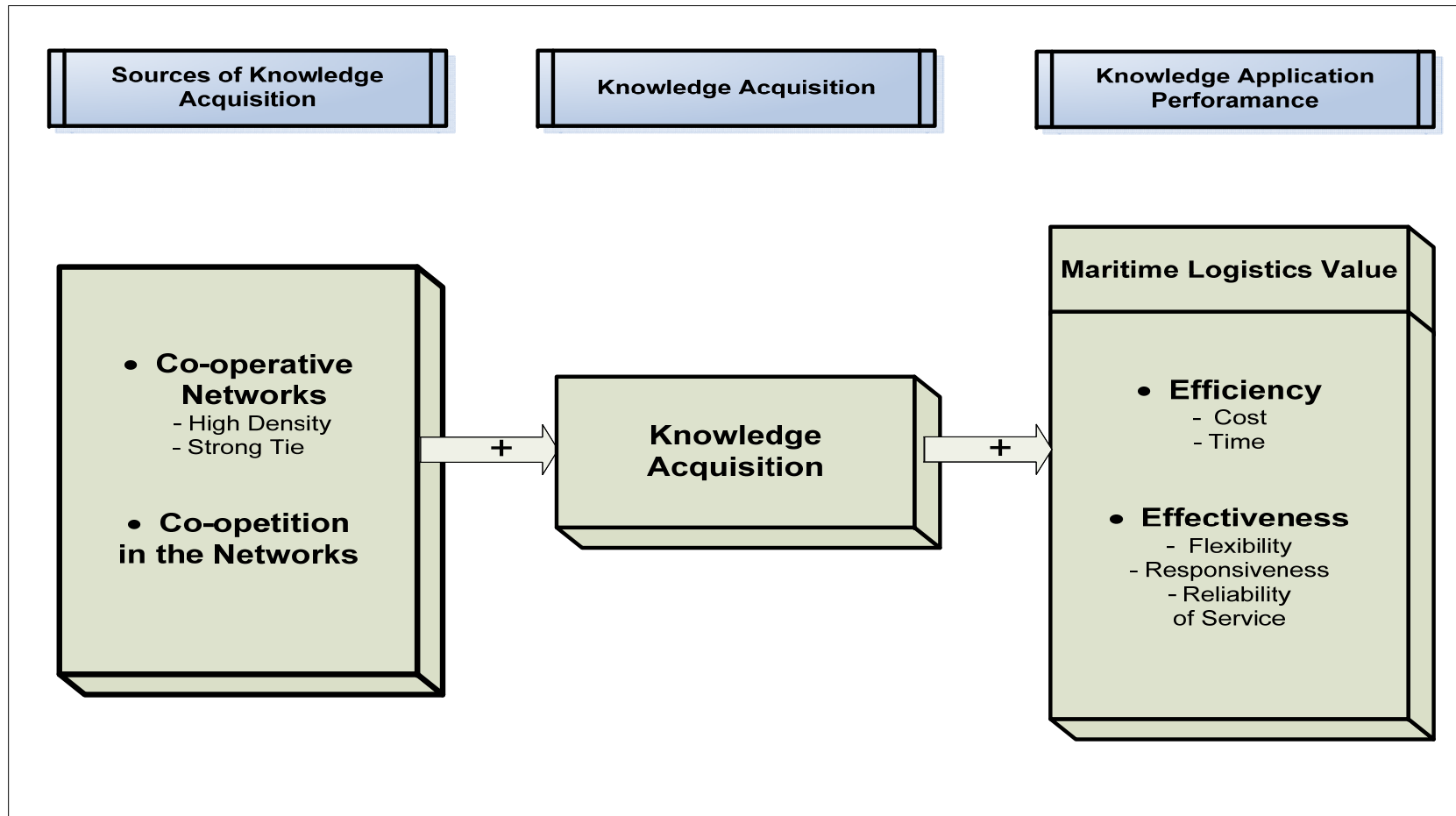
5.3.1 Sources of Knowledge Acquisition by Maritime Operators

- **Co-operative Networks and Knowledge Acquisition**

Knowledge is acquired or created from both external and internal sources, but this study initially focuses on the external route, i.e. an inter-organisational relationship perspective, because numerous strategic literature recognise the leading role of inter-organisational co-operation in acquiring knowledge. Although there are various forms of inter-organisational relationships, this study is concerned with social co-operative network relationships, and dwells upon a number of literature sources that address network informational benefits.

A differentiated position in a network – i.e. structural and relational embeddedness - offers a differential opportunity to achieve competitive benefits and informational priorities (Chen and Miller, 1994). Structural embeddedness relates to the structural position of an actor in a network, and the relational embeddedness is about the extent of the closeness between actors. Gulati (1998) describes that structural embeddedness on a network emphasises the knowledge sharing advantages of the structural position where the actors are connected in the network, and relational embeddedness highlights the role of close or strong ties in gaining valuable information.

Figure 5. 1 Conceptual Framework



Source: Drawn by the author.

A *network density*, which is the most popular variable of structural embeddedness, is referred to as the extent to which ties are interconnected between the players of the network. A highly dense network promotes the development of inter-organisational trust between entities in the network, shared norms, and common behavioural patterns by building up effective sanctions on the virtue of the reputation effect (Granovetter, 1985). As players in a dense network are exposed to faster and more efficient flows of information and other resources, they can share one another's idiosyncratic systems of information collection and distribution. A *strong tie*, as a key variable of relational embeddedness, also supports a knowledge-based advantage, because firms can gain relational trust and fine-grained information exchanges through managing the strong tie between partners (Uzzu, 1997).

With the acknowledged informational benefits of the co-operative network, we regard the network embeddedness (e.g. high density and strong ties) as the first source of knowledge acquisition for maritime logistics operators. Maritime logistics operators work within their own business networks by being vertically and horizontally interconnected to each other. For example, as shipping lines have begun to enter port operations, they have then become the new competitors of the port operators. Alliances and integrations among large shipping lines have facilitated the hub-and-spoke system among ports. The global expansion of shipping lines may also influence the behaviour of freight forwarders and their business relationships. Port operators produce the world-wide network by globally extending their business scope and scale.

Maritime logistics operators may have a lot of opportunities for learning through interaction with the world-wide co-operative networks. The co-operation may include both forms of formal (e.g. strategic alliances, joint ventures, associations and consortium) and various types of informal relations (e.g. meetings, phoning or emails). The better structural position, e.g. embedded in a dense network, maritime transport operators are in, they can have greater number of chances to access to knowledge flows. As they may interact with the more numbers of organisations, they can exchange and share the more knowledge about the maritime logistics.

Stronger ties may also facilitate the vigorous knowledge acquisition of maritime operators. The keeping of increasingly close and strong relationships enables maritime

operators to engage in in-depth communication with one another, thereby allowing them to build up mutual trust among parties (Krackhardt, 1992; Uzzi, 1997; Kraatz, 1998). Such a strong relationship may help maritime operators to more easily share valuable information and knowledge with one another, and mitigate environmental uncertainty.

- **Co-opetition in the Network and Knowledge Acquisition**

Although the co-operative network could be helpful for knowledge acquisition, the effectiveness of knowledge acquisition may be promoted by the extent of competition among the organisations in the network (Tsai, 2002). For example, when maritime transport operators co-operate to share knowledge resources, firms that are intensively competing to develop their own competency can create and acquire knowledge more than others which do not. Internally, they try to evaluate their resource deficiency, and continuously search and assess the values of other firms' knowledge. Externally, they may be strongly inspired by whether their competitors have superior knowledge to themselves, and therefore the competitors' knowledge deserves to benchmark in their operations. If other firms' knowledge is deemed to have many benefits, they will be more enthusiastic to acquire the knowledge. Therefore, one can then expect a positive interaction effect between co-operation and competition (i.e. co-opetition) on knowledge sharing advantages among firms (Lado, Boyd and Nalón, 1997; Tsai, 2002). In this sense, maritime operators can make good use of their co-opetition in co-operative networks in acquiring knowledge.

5.3.2 Knowledge Application Performance: Maritime Logistics Value

Maritime logistics operators could improve maritime logistics value by applying the acquired knowledge. As discussed in Chapter 2, the most significant factors of maritime logistics value are operational efficiency (time and cost), and customer service quality (flexibility, responsiveness and reliability). By continuously acquiring useful information, maritime logistics operators can catch up on new patterns and business practices in the industry, reduce environmental uncertainty, and eliminate wasteful activities. Such benefits may contribute to the reduction of time and costs in their operations. In addition, well skilled employees with the mechanism of knowledge management can reform their working procedures in a systematic manner, which leads to a more productive organisational routine or culture. Consequently, those

organisations may gain numerous advantages over their rivals in improving operational efficiency.

Knowledge management also allows maritime operators to achieve significant customer information, thereby allowing for the updating on market demands. A proactive maritime operator, who listens to customers' comments on their service and perseveres in their effort to respond to various customer demands, may provide their service in a more responsive and flexible way, and elevate the grade of their service reliability. They can also learn from other firms' know-how on the business, and then apply it to their own situation, which could help to improve the uniqueness of their particular service. Thus, managing knowledge effectively is a crucial source for the high quality of maritime logistics service.

In this section, the research has developed a conceptual framework that shows the positive relationship between co-operative/co-opetitive networks, knowledge acquisition and maritime logistics value, and the role of co-operative networks and co-opetition in acquiring knowledge. The methodological issue in this study to clarify the research philosophy and research method is outlined in the following section.

5.4 METHODOLOGICAL FRAMEWORK

Research methodology involves “the nature of research design and methods” (Sarantakos, 2005, p. 30). The methodology of a research normally clarifies the philosophies and methods of the research in order to clearly expound the valid relationship between research questions/objectives and investigated conclusions of the research. Thus, after sufficient understanding on a given critical methodological issue, an appropriate methodology would be selected in order to perform research tasks and draw a conclusion in a rational and logical way.

5.4.1 Philosophical Position

Historically, there are numerous philosophical positions or paradigms that show how scientific research should be carried out (Collis and Hussey, 2009; Ticehurst and Veal, 2000). However, in business and management research, two paradigms, i.e. *positivism*

and *interpretivism*, are most popular (Hussey and Hussey, 1997). The attributes of the two positions are summarised in Table 5.3.

According to Collis and Hussey (2009), positivism, which is based on the approach used in natural science, “roots in the philosophy known as realism” (p. 55), and “is underpinned by the belief that reality is independent of us and the goal is the discovery of theories, based on empirical research (observation and experiment)” (p. 56). In positivism, as the reality is regarded as being distant and separated from the researchers, social researchers stress their role of detached observers of an objective and singular reality; results of the research should be proven accurate and reliable through statically testing validity and reliability (Cresswell, 1994; Hussey and Hussey, 1997). Thus the positivist regards social behaviour as objective fact which can be explained through quantitative tests. They ensure that values, attitudes and biases which distort the objective world fail to be a good research (Hussey and Hussey, 1997).

Table 5. 3 Features of the Two Main Paradigms

Positivism tends to:	Interpretivism tends to:
<ul style="list-style-type: none"> • Use large samples • Have an artificial location • Be concerned with hypothesis testing • Produce precise, objective, quantitative data • Produce results with high reliability but low validity • Allow results to be generalised from the sample to the population 	<ul style="list-style-type: none"> • Use small samples • Have a natural location • Be concerned with generating theories • Produce rich, subjective, qualitative data • Produce finding with low reliability but high validity • Allow findings to be generalised from one setting to another similar setting

Source: Collis and Hussey (2009, p. 62).

On the other hand, interpretivism, which is based on “the principles of idealism” (Collis and Hussey, p. 56), is “underpinned by the belief that social reality is not objective but highly subjective because it is shaped by our perception” (Collis and Hussey, p. 57). Thus interpretivism takes the view that, as social behaviour cannot be separated from the mind of the people, it may be hazardous to directly adopt natural science approaches to the social sciences. Attempting to derive conclusive inferences about subjective human behaviour through the empirical ways of gathering data that are used in the natural sciences may in fact be counterproductive (Ticehurst and Veal, 2000).

The above different philosophies are deeply related to the logical issues of research: i.e. *deductive* and *inductive* stances. Deductive research places its focus on the study in which the entire research process is underpinned by theories, and the theoretical assumption – normally referred to as hypotheses – is then empirically tested by specific variables and data which are numerically measured based on previous theories (Bobbi, 2001; Collis and Hussey, 2009). Thus, “particular instances are deducted from general inferences” (Collis and Hussey, 2009, p. 8).

Table 5. 4 Comparison of Research Paradigms

Philosophical assumption	Positivism	Interpretivism
The nature of reality	Reality is objective and singular, separate from the researcher	Reality is subjective and multiple, as seen by the participants
The nature of knowledge (i.e. what constitutes valid knowledge)	Researcher is independent of that which is being researched	Researcher interacts with that which is being researched
The logic of research	Research process is <u>deductive</u> Generalisation leads to prediction, explanation and understanding	Research process is <u>inductive</u> Patterns and/or theories are developed for understanding
The process of research	Study of cause and effect with a static design - categories are isolated beforehand Results are accurate and reliable through validity and reliability	Study of mutual simultaneous shaping of factors with an emerging design - categories are identified during the process Findings are accurate and reliable through verification

Source: Modified from Cresswell (1994, p. 5).

Inductive research, which is the opposite of the deductive stance, is a study in which theory is eventually developed from an analysis or observation of research data (Bobbi, 2001); “thus general inferences are induced from particular instances” (Collis and Hussey, 2009, p. 8). In this sense, the deductive approach usually involves the positivism of research philosophy, while at the same time the inductive study is closely related to the interpretive paradigm. Table 5.4 summarises the comparison of the philosophical paradigm of research, which involves other classifications such as the logic or nature of the research.

As described in the last section of Table 5.4, a social research can be also classified according to the process of research, which then provides certain guidelines to specify the techniques of and ways in which the research should be conducted and analysed (Ticehurst and Veal, 2000; Sarantakos, 2005). This different research process is normally referred to as the two types of research methods: i.e. quantitative and qualitative methods. The following section will discuss the issue of this research method in more detail.

5.4.2 Qualitative and Quantitative Methods

Quantitative method is underpinned philosophically by positivism, and the logic to draw conclusions is guided by a deductive (i.e. strict, objective, and natural scientific) stance (Sarantakos, 2005). The tool of knowledge extraction in the quantitative method is based on observation and experience, and the methods and findings of research should be investigated by rigorous statistic design and the usage of quantitative data, similar to the ways of the natural sciences; otherwise, the knowledge sourced from other methods such as subjective opinions or understandings is regarded as unreliable (Sarantakos, 2005). In business research, the quantitative method relies on numerical evidence in which researchers establish their hypothesis based on existing theories, and then empirically test the hypothesis by using computerised statistical techniques (Ticehurst and Veal, 2000; Collis and Hussey, 2009). Table 5.5 summarises the nature of quantitative and qualitative research.

Table 5. 5 The Nature of Quantitative and Qualitative Research

Quantitative research	Qualitative research
<ul style="list-style-type: none"> • Sets researchers apart from reality • Studies reality from the outside • Uses closed methods of data collection • Employs a fixed research design • Captures a still picture of the world • Employs scientific/statistical methods • Analyses data only after collection • Produces most useful quantitative data 	<ul style="list-style-type: none"> • Sets researchers close to reality • Studies reality from the inside • Uses open methods of data collection • Employs a flexible research design • Captures the world in action • Employs naturalistic methods • Analyses data during and after collection • Produces most useful qualitative data

Source: Sarantakos (2005, p. 46).

In contrast to the quantitative approach, the qualitative method takes a subjective and inductive stance which is based on the interpretivism of the research philosophy, and employs a more flexible design and methods with naturalistic methods or qualitative data (Ticehurst and Veal, 2000; Sarantakos, 2005). The qualitative method is based on the belief that social behaviour can be observed in ways that are more open, such as observation or in-depth interviewing with a small number of samples as opposed to the testing of a large number of samples in a numeric, scientific and statistical way (Ticehurst and Veal, 2000). Table 5.6 provides a comparison of the two research methods.

The two methods may have their own weaknesses. For instance, the qualitative method may not offer a basis for rigorous generalisations, as it does not strictly require a large sample size when analysing data; thus it also may generate problems when the research results rely largely on the subjective opinions of respondents who are too unqualified to be a good sample. On the other hand, under the quantitative method, if a researcher fails to understand theories and key variables sufficiently, to accurately design a research model and hypothesis, and to adequately operationalise explanatory or dependent variables, the findings of the study may be very risky to test theory and draw conclusions from the results (Kelle, 2006).

Table 5. 6 Comparison of Qualitative and Quantitative Methodology

Feature	Quantitative methodology	Qualitative methodology
Nature of reality	Objective; simple; single; tangible sense impressions	Subjective; problematic; holistic; a social construct
Causes and effects	Nomological thinking; cause-effect linkages	Non-deterministic; mutual shaping; no cause-effect linkages
The role of values	Value neutral; value-free inquiry	Normativism; value-bound inquiry
Natural and social sciences	Deductive; model of natural sciences; nomothetic; based on strict rules	Inductive; rejection of the natural sciences model; ideographic; no strict rules; interpretations
Methods	Quantitative, mathematical; extensive use of statistics	Qualitative, with less emphasis on statistics; verbal and qualitative analysis
Researcher's role	Passive; distant from the subjective dualism	Active; equal; both parties are interactive and inseparable
Generalisations	Inductive generalisations; nomothetic statements	Analytic or conceptual generalisations; time-and-context specific

Source: Sarantakos (2005, p. 47).

5.4.3 Choice of Methodology: Qualitative Approach

In order to decide an appropriate methodology for this study, the two competing research paradigms: i.e. positivism/deduction/quantitative method, and interpretivism/induction/qualitative method have been explored and assessed. It should be noted that it is impracticable if the quantitative stance is selected for the proposed theoretical framework in this study, which applies a knowledge management strategy to maritime operations. As discussed in Chapter 3, in theorising the concept of 'knowledge,' 'knowledge acquisition' 'effectiveness of knowledge management' 'social network embeddedness,' and 'co-opetition,' we must recognise that those concepts, deeply embedded in people's mind or thought, cultures or routines within organisation or between organisations, are abstract, invisible, and socially complex. For example, knowledge, as reviewed in Nonaka and Takeuchi (1995)'s study in the previous chapter, is created through the conversing process of socialisation, externalisation, combination and internalisation within the social context. The exchange of knowledge between people or organisations is promoted by inter-organisational social relationships, such as social network, and competition or co-operation; the practice of inter-organisational social relationships can impact their structural or relational position in a network. In turn, organisations' superior position in a given network may affect new routines and inter-organisational cultures.

Therefore, the thought or practice of people or organisations, i.e. knowledge or knowledge transferring, must not be separated from their social interactions. Thus those social patterns cannot be fully observed until that people's subjective awareness of their socially intrinsic behaviours of acquiring knowledge and enhancing logistics value is examined. In addition, 'the relationship between knowledge acquisition and its effectiveness in the maritime industry' has yet to be empirically tested. Thus such a cause-effect relationship may not be easily examined or analysed with the objective, rigorous, single and statistical tools whose validation has yet to be sufficiently assessed.

With the above argument in mind, this study adopts the qualitative method (i.e. interpretivism and inductive approach), which recognises that reality is not separated from social actors, but is deeply internal to them, and has subjective attributes. As the knowledge management process is identified and undertaken by people and organisations whose perception and attitudes are directly involved in the process, the

value and procedure of the knowledge management process cannot be easily assessed and observed with the quantitative or neutral methods. Instead, the qualitative method may allow the current research to focus more on the subjective aspects of people's perceptions on the knowledge management strategy for maritime logistics value. Furthermore, as the goal of this study is to understand and apply the aforementioned socially complex strategy, it must try to deduce individual comprehension on the strategic issues, and to draw significant strategic implications from people's subjective understandings and opinions (Kamenou, 2002). Such a method may also help to overcome the dangers of using mathematical evidence to arrive at a hasty conclusion on the socially complex world, which represents a common weakness of quantitative research (Kelle, 2006).

5.4.4 Research Design

This study follows the qualitative method under the interpretivism and inductive approach. Figure 5.2 shows the research design of this study, which depicts the research process undertaken to achieve the research objectives.

First, after a broad review of relevant literature in the field, a research gap is identified. From there, the research objectives were established, and relevant research questions are decided. Second, in order to achieve the research objectives, a great number of literatures on global logistics, maritime transportation, and strategic management theory are collected, and then systematically and carefully reviewed. Throughout the literature review, the central constructs and concepts of the research issue, i.e. knowledge acquisition and application performance of maritime logistics operators, are identified and understood,

Following this, on the basis of a wide range of the literature review, the conceptual framework in which we seek to theoretically answer the research questions is developed. Fourthly, the philosophy, methodology, logic and method of a research were reviewed in an attempt to find the appropriate research methodology, and as a result of this preliminary research, the qualitative approach is then chosen for this study. Fifthly, the empirical field studies to examine the actors' perceptions and opinions on the research issue are conducted by the use of an explorative case study and the Delphi survey

method. Finally, following the steps as outlined above, strategic implications and propositions in line with the research objective of this thesis can be drawn.

5.5 QUALITATIVE METHOD IN APPLICATION

Prior to conducting the field study from a qualitative view, it is necessary to design an analytical process that is best suited to the stated research objectives. As described in the previous sections, few studies have dealt with the research topic of this thesis - to adopt the knowledge management system to maritime operations - and therefore the attempt is relatively new and lacks both data and theory. As “exploratory research is conducted into a research problem or issue when there are very few or no earlier studies to which we can refer for information about the issue or problem” (Collis and Hussey, 2009, p. 5), the completion of an explorative study that will determine general patterns in the maritime industry is essential before conducting a main analysis for this thesis. This conduction of an explorative study may help to overcome the potential bias and sterility of a single-analytic method (Denzin, 1970; Collis and Hussey, 2009).

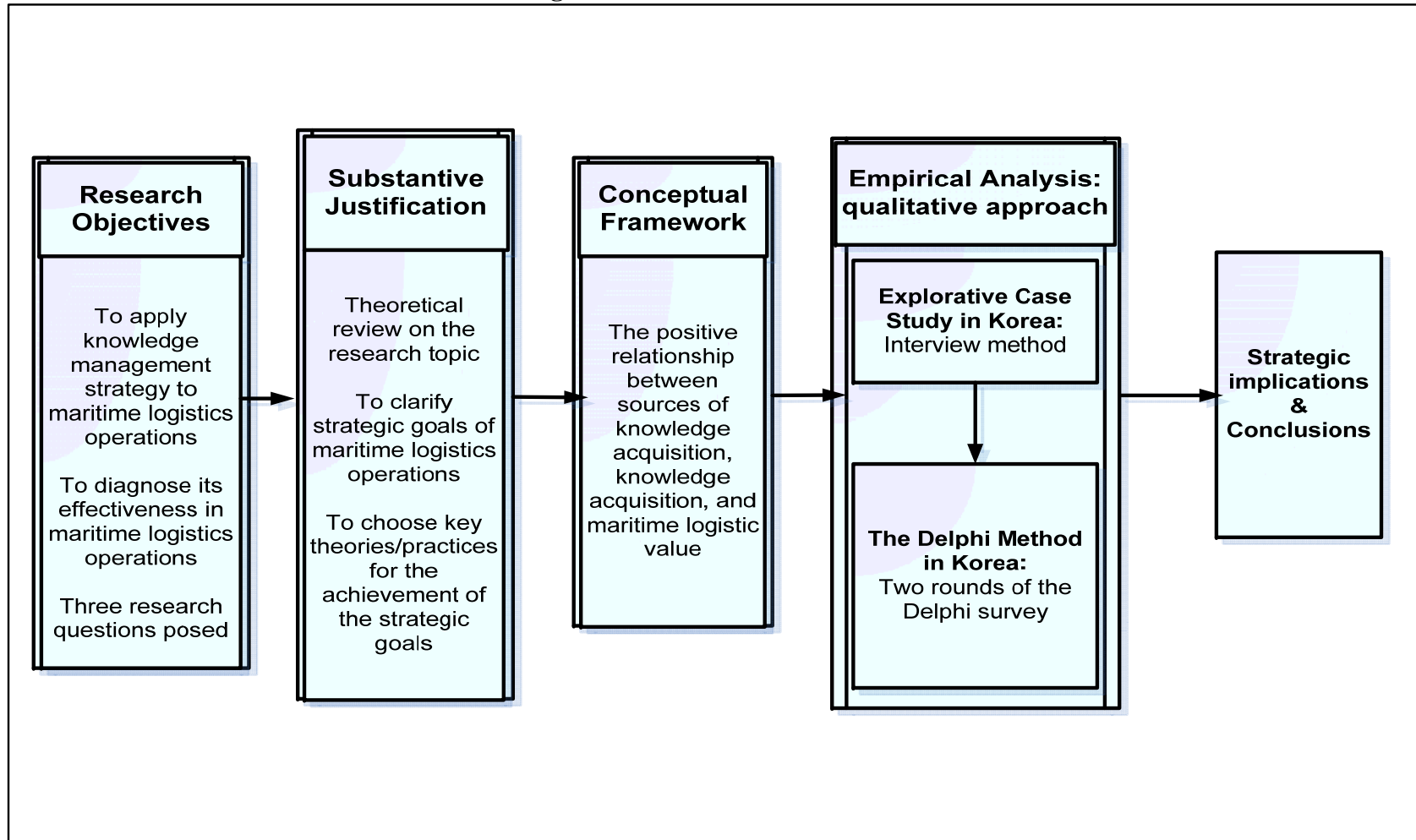
This thesis initially chooses a case study method as an explorative analysis to prepare the next stage of analysis, and the Delphi study is then undertaken as a main analytical tool. The justification and explanation of those analytical tools will be made in succession.

5.5.1 An Explorative Case Study Method

Although there are several typical methods used in exploratory study, the demands of this research dictate that the case study strategy would be the preferred way of exploring the real phenomena in the field as a pre-research; the following constitute the benefits of an exploratory case study (Sarantakos, 2005):

- (i) It will provide in-depth insights into little known patterns in the industry (Ellram, 1996), and
- (ii) It will allow us to catch ideas to be developed for further main analysis (Marginson, 2002).

Figure 5. 2 Research Framework



Source: Drawn by the author.

Thus this study employs a case study method for an exploratory study. When designing a case study, the following points of the method need to be determined:

- (i) Numbers of the case: single- or multiple- case study, and
- (ii) Data sources and collection method: interview, survey, documentation, and direct- and participant- observation.

- **Single vs Multiple Case Study**

A single case is referred to as “one conducted experiment, and is suitable when the case represents a critical analysis to test a well-formulated theory, an extreme or unique case, or a case which reveals a previously inaccessible phenomenon” (Ellram, 1996, p. 100). A single case study may be preferred when a great deal of exploratory findings and well-formulated theoretical background have already been advocated, and the selected case must be the critical case in testing the earlier findings and theories; otherwise, the study may be in danger of misrepresenting the actual field with the associated findings from the single case (Ellram, 1996; Yin, 2003; Sippola and Smale, 2007). In this sense, the single case study may not be preferable for the explorative method for this thesis, as the thesis aims to get insights into the little known patterns of knowledge management strategy in the maritime logistics field, and thus will not gain a great deal of meaningful understanding from a representative single experiment.

Multiple cases, i.e. collecting data from more than one case, allow for the acquisition of rich information from the field. The multiple cases design thus helps to either understand patterns from the similar cases among replications, or to extend or modify any practice or theory from the dissimilar or contrasting case results (Ellram, 1996; Collis and Hussey, 2009). In this sense, the multiple cases method would be appropriate for this study, as it may allow us to get rich information and identify some patterns of the field by drawing out any similarities or differences among multiple samples.

- **Sources of Data**

There are several methods used to collect data in a case study: documentation, archival records, interviews, direct observations and participant observation (Yin, 2003). *Documentation* is collected data from a variety of forms of papers, e.g. reports or formal documents, for commercial or academic use (Yin, 2003). *Archival records* includes

“organisational records such as charts and budgets during a certain period; survey data; personal records such as diaries, calendars and telephone listings; service records such as showing the number of clients served over a given period of time; lists of names and other relevant items; and survey data such as census records or data previously collected about a site” (Yin, 2003, p. 89). *Direct- and participant- observation* is about data collected from observing an event. That data can be collected either by an observer’s direct participation in the event, or merely by indirect observation without participations (Yin, 2003).

Interview is one of the most fundamental sources of qualitative study, including a case study (Easterby-Smith, Thorpe and Lowe, 1991). Under a qualitative approach, an interview is often used to explore “data on understanding, opinion, what people remember doing, attitudes, feelings and the like, that people have in common” (Arksey and Knight, 1999, p. 2). The interview is a very flexible method, since interview questions are asked of interviewees in a relaxed, informal mood, and all the processes and opinions of the interviewee can be reflected in the findings of the case study, rather than through following an objective numeric formula (Maylor and Blackmon, 2005). Thus, such purposes of the interview method would be well suited to the explorative study, which aims to look into and corroborate the assumed conceptual relationships and to explore some contextual phenomena in the field. In this regard, this study chooses an interview method for the explorative case research.

In summary, this study chooses the case study method for an exploratory study. A multiple cases-based interview method will be employed. The sample cases will be selected from several maritime logistics companies in Korea. The entire interview process for the case study will be described in the next chapter.

5.5.2 The Delphi Method

The Delphi method will be further chosen to investigate whether the assumed relationships in the conceptual model are supported by the expert respondents in the maritime transport field. The concept, process and application of this method are examined in this section.

- **The Delphi Method in Concept**

The Delphi study is an empirical method that is used to get information from experts on the research topic. Generally, the panel of experts who are carefully selected by the researcher are required to comment or answer on the specific context being investigated; and the researcher then draws empirical findings from the multi-rounds of the panel's opinion (Sarantakos, 2005).

More specifically, Linstone and Turoff (1975) define a Delphi study as “a method of structuring a group communication process, so that the process is effective in allowing a group of individuals, as a whole, to deal with complex problems” (p. 3). Horrigan (1985) notes that the Delphi study proves intensely useful as “the method provides refined values for measures that have been gathered from several respondents who all estimated the value of the same phenomena or attribute” (p. 691).

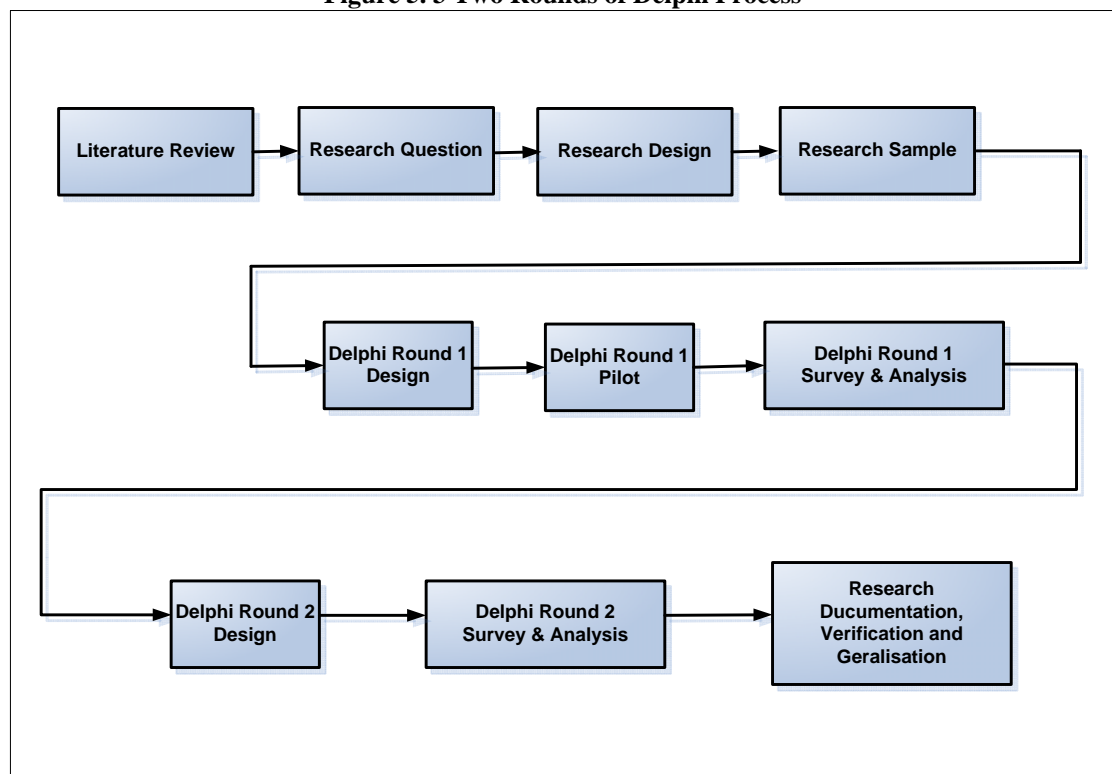
Researchers have identified the main features of the Delphi method (Linstone and Turoff, 1975; Murry and Hammons, 1995; Loo, 2002; MacCarthy and Atthirawong, 2003) as the following:

- (i) A carefully selected panel of experts: the respondents of the Delphi study must be those who can discuss a broad range of views on the topic or issue being analysed.
- (ii) Anonymity among the panel of experts: the principle of anonymity among the respondents allows the participants to express their opinion in a more comfortable atmosphere and to freely change their previous answers.
- (iii) Iteration: the method obtains the information from the multi- and iterative- rounds of questionnaire. Throughout the iterative rounds, the respondents of the panels have the opportunity to revise their previous answers based upon the group opinions answered by the other panels as a whole.
- (iv) Controlled feedback and statistical group consensus: it employs a repetitive process in which the researcher summarises and averages group responses of panels, and then reprocesses the collective views. The process may aim to deduce convergence on a common view or group consensus, but some others may collect various views of the panels without concentrating on the deduction of the collective agreement.

The typical Delphi process is depicted in Figure 5.3, which is adapted from Skulmoski, Hartman and Krahn's (2007) study. After developing specific research questions, the

research methodology is designed and the Delphi method is chosen, and then research participants are selected. These research participants must be highly qualified experts, since their opinions largely affect the output of the study. When designing the questionnaire of the first round of Delphi, the researcher must pay careful attention in order to ensure that respondents understand the meaning of the questions and provide appropriate answers. A pilot study is performed with the aim of testing and altering the Delphi questionnaire if needed.

Figure 5. 3 Two Rounds of Delphi Process



Source: Modified from Skulmoski et al. (2007, p. 3).

In the first round, the selected experts are required to complete the Delphi questionnaire and express their opinions from their views on the issue. The collected responses are then summarised and analysed according to the research paradigm (e.g. qualitative/quantitative coding, or calculating mean or standard deviation) in order to systemically identify the collective opinions. Throughout the process, the questionnaire of the second round is developed, with the aim being that the contents of the original questionnaire can be altered if needed. The second round (or the additional third round if needed) of the Delphi study is processed in a manner similar to that which has been

processed in the first round. Finally, the cumulative collected Delphi results are verified and generalised by the researcher (MacCarthy and Atthirawon, 2003; Sun and Scott, 2005; Scholl, Konig, Meyer and Heisig, 2004; Skulmoski et al., 2007; Harlow, 2008).

The process outlined above can also have additional rounds of the Delphi process, according to the aim of a research. If a research aims to draw a careful consensus between participants, the Delphi rounds may be prolonged until reaching the consensus (Linstone and Turoff, 1975). Sometimes, certain attempts include an explorative study to develop the survey questionnaire into round zero of the Delphi process along with two successive rounds of survey Delphi process, which then in turn is officially identified as three rounds of the Delphi method (Jun-Erceg, Pandza, Armbruster and Drher, 2007)

The Delphi method was originally introduced and developed to deduce a consensus among a panel group of experts. However, rather than deriving a collective consent from the respondents, the method is often used only to observe and learn the various opinions of the topic panelists, in order to then reflect the views of experts into important strategic decisions or major policy issues (Turoff, 1975). *The policy Delphi* is a good example of the method. Turoff (1975) suggests that “Generating a consensus is not the prime objective in the policy Delphi study (p. 84)... All possible options could be put on the table for consideration, and the acceptability of any of them would be examined and estimated (p. 87).” In this respect, this study falls into ‘the policy Delphi’ category by assembling various possible opinions of experts, rather than eliciting a common consensus.

• **The Delphi Method in Application**

The Delphi method is widely used in a general and/or strategic management context. It is recognised as a powerful tool, especially useful for the following: the empirical development of organisational policies; the planning for administrative programs, the analysis of hypotheses, etc. (Loo, 2002).

The Delphi study is a flexible research technique that has been successfully applied to different possible research methods, such as the qualitative method, the quantitative method, or a combination of both approaches. Normally, the Delphi method is used from a qualitative approach “when there is incomplete knowledge about a problem or

phenomena, the method can be applied to problems that do not lend themselves to precise analytical techniques but rather could benefit from the subjective judgments of individuals on a collective basis” (Skulmoski et al., 2007, p. 2).

Under the qualitative approach, the Delphi method could provide good insights or ideas to develop both a research hypothesis and a survey questionnaire that is then to be statistically tested (Anantatmula and Kanungo, 2006), through enabling us to obtain reliable information on the topic from a group of experts (Yih-Tong Sun and Scott, 2005). For instance, Anantatmula and Kanungo (2006) perform the Delphi method with face-to-face interviews and personal discussions – these interviews and discussions then help to support their literature review, and assist them in developing a survey questionnaire. Sun and Scott (2005) employ the two-rounds of the Delphi method to examine their research questions. In the first round, seventeen participants are asked to reply to the open-ended questions, and subsequently in the second round, the participants are then asked to rank some lists of factors compiled from the first round (Sun and Scott, 2005).

Yet even under the qualitative approach, other attempts are made to assemble more quantitative data by using the numerical point (e.g. five- or seven-point) of Likert-scale (MacCarthy and Atthirawong, 2003; Scholl, Konig, Meyer and Heisig, 2004; Jun-Erceg, Pandza, Armbruster and Drher, 2007). These scales try to examine certain patterns or relationships in the field by calculating descriptive statistic indicators, such as frequency, means and standard deviation. Generally speaking, despite the fact that they ensure the analysis, feedback and summary of their responses are investigated by numerical indicators, these methods are regarded as qualitative, since such a Delphi design does not aim to statistically test a rigorous mathematical modelling or a hypothesis under positivism/deductive and quantitative mechanism, but to identify certain patterns and trends from experts’ professional opinion which are summarised within a simply calculated numerical index under the interpretivism/inductive stance.

Compared to the qualitative approach, the Delphi method is used as a good quantitative tool for obtaining statistical information from the participants, as well as testing the hypotheses of a given research question. Harrigan (1985a; 1985b) analyses several hypotheses of the relationship between independent and dependent variables about vertical integration and corporate strategy by performing three rounds of the Delphi

survey process. Harlow (2008) also tests two hypotheses about knowledge management by conducting two rounds of Delphi survey.

Table 5. 7 The Delphi Study and Research Method

The Delphi Study		
	Qualitative Approach	Quantitative Approach
Data Collection	Interview or survey	Interview or survey
Questionnaire	Open-ended or semi-structured questions Quantitatively developed questions (e.g. using numerical points such as five- or seven- point or Likert scale)	Quantitatively developed questions under rigorous operationalisations and measurements.
Goal of the Delphi Method	To identify patterns or phenomena under the research object To forecast current or future trends of a target industry	To analyse mathematical modeling To statistically test the hypothesis
Results of the Delphi Method	The results and findings rely on the subjective opinions of the panels of experts in the field	The results and conclusions should be verified by the statistical significance

Sources: Compiled from Harrigan (1985a; 1985b); Cooper (1994); MacKinnon and Forster (2000); Loo, (2002); MacCarthy and Atthirawong (2003); Scholl et al. (2004); Anantatmula and Kanungo (2006); Jun-Erceg et al. (2007); and Skulmoski et al. (2007).

In the logistics field, the Delphi survey method is widely applied to forecast some logistics trends. For example, Cooper (1994) applied two-rounds of the Delphi survey method to forecast the development of logistics systems in Europe up to the year 2001. MacKinnon and Forster (2000) also conducted two-rounds of the Delphi survey to forecast the trends of the European Logistical and Supply Chain from the year 1999 to 2005. Both studies aim to elicit opinions from the specialists in the field, and forecast the future trends and relative strengths of some factors by employing the mean and standard deviation. As the goal of such Delphi designs in logistics is to forecast current movement in the industry, and not to test a hypothesis with a rigorous statistic model, the research methods would have followed the qualitative approach. Table 5.7 describes the relationship between the Delphi study and research methods, and Table 5.8 shows a brief summary of earlier Delphi studies.

This study will follow the qualitative Delphi survey method, under which the questionnaire consists of both open-ended and numerically estimated questions. The justification of employing such a Delphi method is discussed in the next section.

- **Justification of the Delphi Survey Method**

Important features which distinguish the Delphi survey from some other survey methods are: (i) its objective to summarise initial information gathered from the panel of experts, (ii) to give an opportunity to the panel to modify or refine their initial responses based upon the group opinions of participants, and (ii) the desire of the study to reduce the psychological effects through the use of a principle of anonymity (Mitroff and Turoff, 1975).

The conceptual framework of this study assumes relatively new constructs and relationships which lack a comprehensive body of empirical analysis or practices; thus, participants might not understand or recognise the explicit process of the model and may have incomplete knowledge about the concepts, such as knowledge management and maritime logistics value, even though firms have already implemented it in ways and taken advantage of the process. This fact means that there could be some risk of participants responding in error due to possible misapprehension or misjudgment, especially if they are asked the questions only once, and not given any opportunity to refine their responses based upon the collective views of the group. These possible errors could be avoided, however, by the Delphi survey being structured so as to ask each question at least twice, and through giving each participant an opportunity to revise their previous answers.

Furthermore, no attempt in the maritime transport industry has been made to establish mathematical measurements of the concepts and variables applied in the conceptual model, such as network density, tie strength, and co-opetition. And few statistical tests have been done in the field to examine the relationships between social network, knowledge acquisition and maritime logistics value. As such, the study may not permit the rigorous measurements of the concepts alongside the application of precise analytical techniques. In this case, we must depend upon “benefits from more subjective judgments of individuals on a collective basis” (Linstone and Turoff, 1975).

Table 5. 8 Earlier Delphi Studies

Research Area	Research Method	Researchers	Research Task	Delphi Round	Panel of Experts	Analysis tool
Management	Quantitative	Harrigan (1985a; 1985b)	Testing Hypotheses on vertical integration and corporate strategy	Field interview for pre-testing the hypotheses & Three-round Delphi study	111 managers of the target firms (1985a); 92 managers who are familiar with the target business and industry (1985b)	Testing regression model for the relationship between independent and dependent variables
	Qualitative	MacCarthy and Atthirawong (2003)	Examining the influence of factors impacting global firms' location decisions	Survey throughout the two-round Delphi study Part A of the questionnaire: open-ended questionnaire Part B: rating (7 -point Likert scale) the importance of the factors in location decisions (1- not important to 7- very important)	20 panelists who are from academia, government and consulting firms worldwide	Analysing the averaging rating of the responses
Knowledge Management	Quantitative	Harlow (2008)	Testing hypotheses about tacit knowledge and firm performance	Two rounds of the survey are performed on knowledge management professionals who are all at the senior management level.	108 managers of the knowledge management industry participated in the survey.	Testing regression model for the relationship between knowledge and firm performance
	Qualitative	Jun-Erceg et al. (2007)	Discussing issues of absorptive capacity in European manufacturing	Zero round: 280 manufacturing experts to develop codification of knowledge and make questionnaires First round: the survey was conducted via an electronic questionnaire which was mailed to experts. 3,112 experts participated in the first survey round. Second round: 1,359 experts replied to the survey. Finally, they deduced eight statements of the findings from the Delphi rounds.	Manufacturing experts from industry, academia and policy-making institutions	Description by the authors

	Qualitative	Anantatmula and Kanungo (2006)	Testing hypotheses about knowledge management outcomes	Delphi approach throughout in-depth interview and personnel discussions is conducted.	153 experts of academicians and senior knowledge management professionals participated in the Delphi study.	The Delphi method was used just for preceding the survey method.
	Qualitative	Sun and Scott (2005)	Investigating barriers to knowledge transfer	In the first round, the major barriers in the transfer of knowledge are identified. In the second round, the critical sources of the barriers are derived.	17 experts, who have more than four years of experience and are a mix of junior to senior managers in the organisations.	Description by the authors
	Qualitative	Scholl et al. (2004)	Reviewing the field of knowledge management and getting an outlook on worthwhile developments for the next ten years	The study consisted of two rounds: the first-round questionnaire comprised six open-ended questions to get all perspectives on knowledge management. The second round questionnaire condensed these answers from the first round into scalable questions (7-point Likert Scale) in order to get precise estimates on all topics.	21 experts with a natural/technical sciences background and have a business administration or social sciences background participated in the study.	The frequencies of the categories in the first round; Standard deviations in the second round
Logistics	Qualitative	Cooper (1994)	Forecasting the future development of logistics systems past the year 2001	Two-rounds of Delphi survey method	176 specialists from six European countries	Central tendency and variability (mean and standard deviation)
	Qualitative	McKinnon and Forster (2000)	Forecasting the European Logistical and Supply Chain Trends: 1999-2005	Two-rounds of Delphi survey method	129 logistics specialist in eighteen European countries	Central tendency and variability (mean and standard deviation)

Source: Compiled from various sources.

When it comes to the method of data collection in the Delphi survey, this research will develop a questionnaire based on the results of the exploratory case interview. This exploratory case interview will help to illustrate the larger picture of the research issue, and provide insight into understanding general practices in the maritime logistics field. But the concepts and terms to be investigated in this study are too new and too many to answer in a compact, simple and easy way. Thus, the questionnaire endeavours to help streamline these complexities through developing numerically estimated questions, each of which offers a brief explanation on the relevant concepts (i.e. the five-point scale). This will help to ensure that respondents easily understand the terms, and are able to answer more easily and quickly. However, some of the questions, which will benefit from respondents being able to answer in their own words, are thus asked in an open-ended manner.

With these strengths in mind, the goals of the Delphi survey in this study are as follows:

- (i) To understand and diagnose the present status of the assumed relationship in the conceptual model (e.g. co-operative networks, co-opetiion, knowledge acquisition and maritime logistics value), based on the views of a panel of experts in the Korean maritime industry; and
- (ii) To acknowledge the potential usefulness and strategic significance of the knowledge management system in the maritime logistics industry.

• **Design of the Delphi Survey Method**

As discussed in the previous section, the Delphi study typically consists of two, or more (if needed) phases of Delphi rounds (McKinnon and Foster, 2000; Sholl et al., 2004; Skulmoski et al., 2007). When more than three phases of the Delphi round are performed, the first round of the Delphi study has the same purpose as an explorative analysis: to identify a broad range of issues on the topic; to ensure that the next rounds are able to increase their focus on the specific variables to be examined; and to help formulate the questionnaire of the second-round (Loo, 2002). In the case that such a type of explorative study is separately conducted and a questionnaire for the successive survey is then formulated based on the previous explorative study, or that the aim of the Delphi method lies not in eliciting the common consensus of its participants, two rounds

of Delphi survey are commonly used (Loo, 2002; Anatakmula and Kanungo, 2006; Jun-Erceg et al., 2007).

As this study will undertake an explorative case study which helps to identify key variables and develop a structured questionnaire, it is therefore not necessary to conduct three or more than three rounds of the Delphi process. Therefore, this study will benefit from the employment of *two-rounds of the Delphi survey method*.

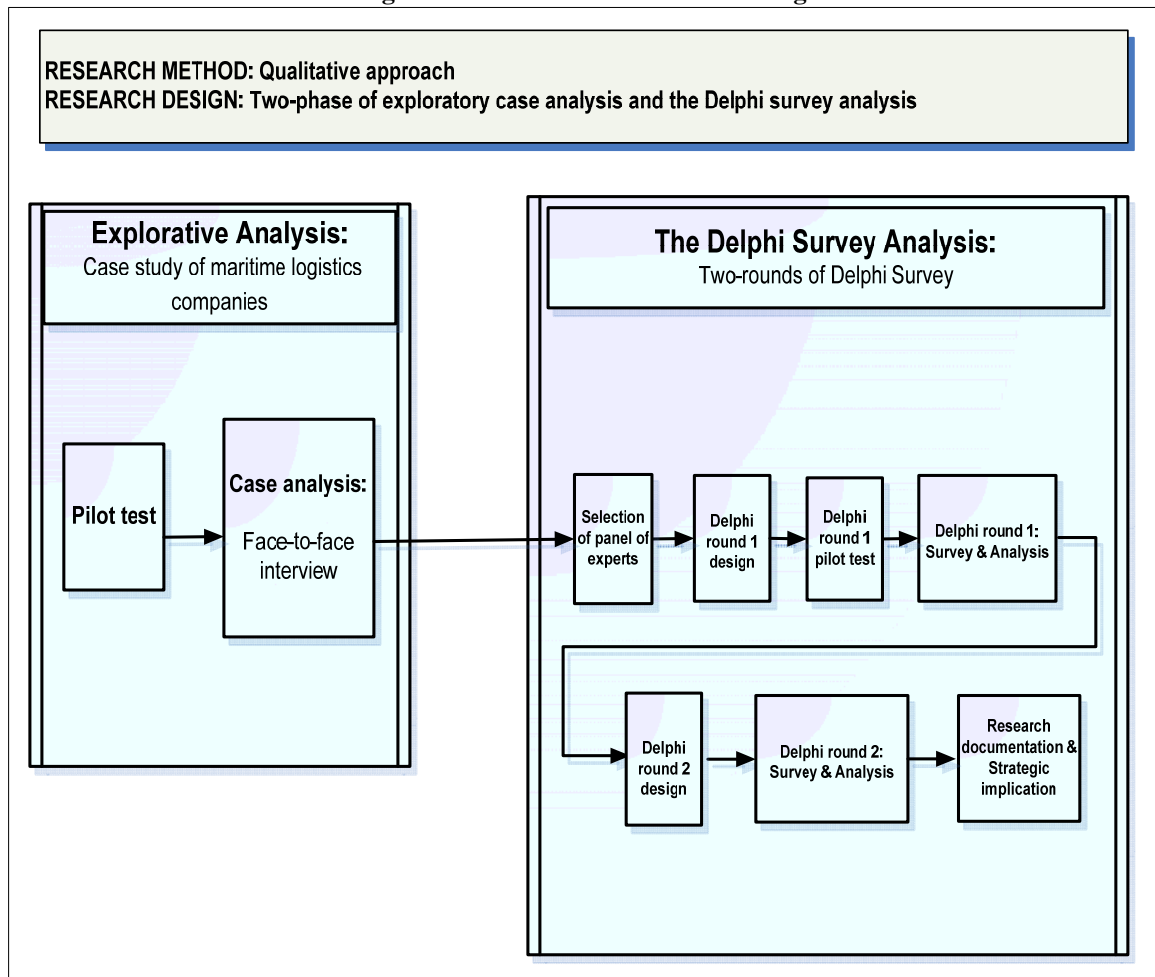
When it comes to *a mean of collective opinions of the panel*, like the earlier policy Delphi studies (MacCarthy and Atthirawong 2003; Scholl, et al., 2004) and most logistics-related Delphi studies (Cooper, 1994; McKinnon and forster, 2000), this study summarises the group opinions by calculating the indicators of mean and standard deviation on each question. Each value of mean and standard deviation in the first round is attached for the respondents' reference when distributing the second-round of the questionnaire. The panels are then asked to reconsider the same questions by referring to the collective group opinions of other respondents, so that they have room and scope to alter their previous answers if necessary.

The two rounds of Delphi survey in this study will be used with the following procedures:

- (i) The literature review and explorative case study contribute to the development of the questionnaire of the Delphi survey;
- (ii) A panel of experts who are qualified to some strict criteria is selected;
- (iii) A pilot test on each subsequent question is initially performed, which may allow to modify the questionnaire in order to improve the comprehension of respondents and solve any possible procedural problem.
- (iv) The finally developed questionnaires are distributed to the panelists, who will then be asked to respond to the questionnaire;
- (v) The collected responses from the first round are summarised by using 'mean values' and 'standard deviations.' Some problems with the questions will be corrected and modified if needed;
- (vi) The questionnaire which is attached to the collective views of the first round will be re-sent to the panels, and will then be re-collected;

- (vii) The proposed relationships of the conceptual model are then examined with the collected responses; and
- (viii) Discussions and implications will be suggested in the last section.

Figure 5. 4 Research Method and Design



Source: Drawn by the author.

In summary, Figure 5.4 presents the process of the research design and method for this thesis. As addressed in the previous sections, the research method of this study consists of two phases, which themselves consist of (i) an explorative case study and (ii) the Delphi survey method. An exploratory case study, interviewing the practitioners who work in the leading maritime logistics companies in Korea, can give us a significant insight into the research topic, and will help to develop the survey questionnaire used in the next analysis. The pilot test on each phase may reduce some possible risks in generating the research questionnaire, and will improve the respondents' comprehension of the questions. Throughout the two-round process of the Delphi survey method,

critical strategic implications on knowledge acquisition and application performance for maritime logistics value may be deduced.

5.6 VALIDITY AND RELIABILITY ASSESSMENT

Generally speaking, social research must follow certain standards or principles on the quality of the method, which ensures that the analytical method is valid and accurate for the purpose of the research. The ‘validity’ and ‘reliability’ are regarded as the central components when assessing the quality of a research (Mason, 2002; Sarantakos, 2005).

Despite the fact that the Delphi method has been widely accepted by numerous scholars due to a great deal of its benefits, considerable efforts to assess the validity and reliability of the method are needed in order to minimise some possible methodological shortcomings, such as the difficulty of checking the method’s accuracy, or the risk of misrepresenting the associated findings (Ellram, 1996; Landeta, 2006). In this section the validity and reliability of the Delphi survey is tested in order to properly analyse and discuss the results from the survey.

5.6.1 Validity

Validity concerns “whether an instrument measures what it is supposed to measure, and whether this measurement is accurate and precise” (Sarantakos, 2005, p. 83). The central issue of validity is referred to as “judgements about whether you are measuring, or explaining, what you claim to be measuring or explaining” (Mason, 2002, p. 188). Miles and Hubermann (1994) suggest that the validity of a research is “some practical guidelines” (p. 277). Generally speaking, there are different types of validity in quantitative research: for example, ‘face validity’, ‘content validity’, ‘construct validity’, and ‘internal/external validity’. Such types of validity can be checked by using statistical or conceptual methods. For example, construct validity is referred to as whether the concepts being studied are accurately measured; and internal validity is about whether certain conditions, or instruments or procedures of a research affect results of the research; and external validity is about the extent to which a study’s findings can be generalised (Yin, 2003).

The above argument on the research validity focuses more on a quantitative study. Validity in a qualitative work, despite having no general standards which the qualitative researcher should follow, is generally evaluated differently from case to case, depending on the way of data collection or interpretation of the data (Sarantakos, 2005; Collis and Hussey, 2009). Thus, researchers in a qualitative study have called validity by a variety of different names, such as “credibility, trustworthiness, authenticity, objectivity, transferability, confirmability, and verification.” (Sarantakos, 2005, p. 86).

Sarantakos (2005) classifies the above different ways of validity of the qualitative research method into the following types: cumulative validation, communicative validation, argumentative validation and ecological validation. In this regards, this study tests the validation of the Delphi survey method, based on the Sarantakos (2005)’s study.

- **Cumulative validation:** a research is regarded as being validated if the results are consistently similar to other or prior studies. Thus, a qualitative researcher can compare his or her finding with other studies which are relevant to his/her research issues. Should their findings be supported by the outcomes of other studies, the validity of their study is evaluated as high (Sarantakos, 2005). Miles and Hubermann (1994) give some practical queries in relation to such validity: ‘Are the presented data well linked to the categories of prior theory?’ ‘Are the findings congruent with, and connected to, the prior theory?’

In this thesis, the constructs in the proposed model, i.e. inter-organisational networks, knowledge, knowledge acquisition and maritime logistics value, have been developed throughout an extant body of literature review in logistics, maritime transportation and strategic management theories. The questionnaire for the Delphi survey was also formulated by coupling it with a great number of empirical articles. The results of both an explorative case study and the Delphi survey method were well supported by the contention of previous studies. In this regards, the research design may have a high cumulative validation.

- **Communicative validation:** the communicative validation entails “the involvement of the participants - by checking accuracy of data, evaluation of project process and change of goals, by employing expert external audits, and by using triangulation – in

order to achieve multiple perspective and to confirm authenticity” (Sarantakos, 2005, p. 86).

According to Harrigan (1985b), “the Delphi survey method could allow us to refine estimates based upon imperfect information” (p. 412). In this study, the participation of both the managers of maritime operators (who participate through the explorative case study) and the panel of experts in the industry (who participate through the two rounds of Delphi procedure), including each of the pilot-tests, may allow us to comprehensively revise possible problems of variables or research direction. The participation may also enhance the accuracy and authenticity of the project process and data.

- **Argumentative validation:** “this form of validity can be established through the presentation of the findings in such a way that conclusions can be followed and tested” (Sarankatos, 2005, p. 86).

In drawing conclusions, the researcher links the logical relevance between previous literatures, conceptual framework, and empirical findings of the exploratory case study and two rounds of the Delphi survey. Throughout the procedures, the proposed relationships can be tested, and propositions and strategic implications would then be followed. Those propositions and conclusions may contribute to the development of new hypotheses about the research issue of this study, which can be empirically tested in future research. Such a research procedure may contribute to a high argumentative validation.

- **Ecological validation:** “a study is held to be valid if carried out in the natural environment of the subjects, using suitable methods and taking into consideration the life and conditions of the researched” (Sarankatos, 2005, p. 87).

All of the case study interviews proceeded at quiet places, in a stable and comfortable mood. The Delphi survey was distributed to all of the panelists through email, or through a direct visit by the researcher. When the researcher went and met the panelists in their respective offices, the environment for completion of the questionnaire was also calm, and quiet enough for the respondents to concentrate on answering all of the questions. It was expected that the respondents who completed the online survey were

able to complete the questionnaire at their own convenience, during a time when the respondents felt free and comfortable to answer the questions.

5.6.2 Reliability

Reliability is concerned with the credibility of the findings of the research, and the credibility is evaluated through whether the measurements of the research consistently produce the same results (Miles and Hubermann, 1994; Sarantakos, 2005; Collis and Hussey, 2009). Reliability in qualitative research often appears under different names, such as “consistency, auditability, credibility, applicability, confirmability, coherence, openness and transferability” (Sarantakos, 2005, p. 90). In order to evaluate the reliability of a qualitative study, researchers should consider the following: whether the instrument/indicator produces consistent results; and whether the instrument is biased by being affected by the researcher, the subject or the research conditions (Sarantakos, 2005).

Flick (1998) provides the following check-list in order to evaluate the reliability in a qualitative approach: “prolonged engagement and persistent observation; peer review or debriefing; member checks (communicative validation) and external auditing; and checking the ‘appropriateness’ of the terms of reference of interpretations and their assessment” (p. 231-2).

This study follows Flick’s (1998) paths in order to check the reliability of the research method. Firstly, the data collection procedure of this study, i.e. the explorative case study and two-round of the Delphi survey method, took a period of about one year, from April 2008 when the interviews of the explorative case study started, to March 2009 when the two-rounds of the Delphi survey were completed. During this prolonged period for the data collection, it was possible for the researcher to observe the consistent and persistent empirical results. Secondly, in relation to the ‘peer review or debriefing’, the questionnaire for both interviews and the Delphi survey, which were initially developed by the researcher, were reviewed by three of the supervisors of the researcher and then revised based on their comments. Both of the analytic procedures (i.e. case study and the Delphi survey) were also revised numerous times through each of the pilot tests.

Subsequently, the member checks (communicative validation) and external auditing were evaluated in the previous section for 'communicative validation'. Finally, the aforementioned analytic processes enabled the researcher to filter and refine comprehensive understanding of previous findings, and then helped to enhance the 'appropriateness' of the terms of interpretations of references of this study. In addition, the entire research process of this study, including the literature review, research questions, research design, empirical analysis and findings and the conclusion, are described as much as possible in a transparent, logical, objective and consistent way.

5.7 SUMMARY

This chapter discusses the theoretical foundation and methods employed by this study. Research questions, the conceptual framework, methodological discussion and the analytic process of the research were introduced.

A qualitative method was chosen to investigate the conceptual framework, which assumes the positive influence of knowledge management on maritime logistics value. To conduct the qualitative research analysis, an explorative case study and the Delphi survey method were considered, the analytic process was designed, and the quality of the method was diagnosed through assessing the validity and reliability of the method.

An initial explorative case study targeting maritime logistics companies in Korea will be conducted to understand overall patterns of the maritime operators involving the research topic. The process and details of the case study will be described in the next chapter.

CHAPTER 6 EXPLORATIVE CASE STUDY ON MARITIME OPERATORS IN KOREA

6.1 INTRODUCTION

In this chapter, an explorative study is performed in order to identify the patterns of knowledge acquisition and its effectiveness in the maritime logistics industry, which are assumed in the conceptual model. A case study method is chosen as the explorative analysis.

The case study is based regionally on the Korean maritime industry. The unit of analysis employed in this study is that of individual companies which operate in the Korean maritime logistics business. In-depth face-to-face interviews with a semi-structured questionnaire were conducted. A total of nine maritime logistics companies (i.e. shipping lines, port terminal operators and freight forwarders) in Korea participated in the interviews, and the interviewees discussed their practices in the Korean maritime industry. The case study employed in this study aims to:

- (i) achieve in-depth insights into the knowledge-based strategy for the maritime logistics industry in Korea; and
- (ii) develop ideas for further analysis, such as gaining fruitful sources in operationalising variables and developing a questionnaire for the Delphi survey method.

This chapter consists of the following three parts: (i) introducing the explorative case study design, (ii) briefing the process of the case study conducted in this study, and (iii) summarising the findings of the interview.

6.2 EXPLORATIVE CASE STUDY DESIGN

6.2.1 Case Selection of Maritime Operators in Korea

The geographical and strategic significance of Korea in global maritime transportation was described in Chapter 3. Having recognised the country's importance, this study chooses cases from the Korean maritime industry. Generally speaking, as described in Chapter 3, maritime operation consists of shipping lines, port terminal operators and freight forwarders. Hence, the cases are selected from the sectors of leading maritime operators in Korea, in order that the study may accurately reflect the patterns on the research issue for each business type.

The sample cases of port terminal operators were selected from the companies which are engaged in cargo handling services at a port in Korea, such as loading or unloading, stevedoring, and the storage of container cargoes. The cases of shipping lines were selected from the companies which offer regular schedules of sails for international sea transport of container cargoes in Korea. Freight forwarders selected for the case study are the companies which connect shippers and shipping lines by offering various maritime logistics-related services as an agency of shippers, such as booking vessel space, preparing relevant documentation and arranging inland transportation.

6.2.2 Profiles of Interviewed Companies and Interviewees

A total of nine companies from the maritime operators contacted in Korea kindly responded to the interview. A brief profile of each of the companies that consented to the interview is described in Table 6.1.

Firstly, a total of three port terminal operators responded to the interview. HANJIN PACIFIC Co. Ltd., a subsidiary of HANJIN SHIPPING Co. Ltd., is one of the leading container terminal operators in Korea. They operate four terminals in Busan Port in Korea, and are currently expanding their operations abroad to countries such as Taiwan, Japan and the Netherlands. KOREA EXPRESS Co. Ltd. was originally one of Korea's largest total cargo delivery companies, and is now one of the most successful port terminal operators in Korea. The company operates a lot of terminals in Korea's Busan Port and Gwangyang Port, and offers port terminal operation, logistics and other transportation-related services. SEBANG Co. Ltd. is also one of the most popular container handling operators in Korea. They provide various logistics services, including the handling of export and import containers, stevedoring, transportation and storage of bulk cargoes, installation and erection of over-dimensional, and a weight cargoes and construction business.

Secondly, three shipping lines are used in this case analysis. HYUNDAI SHIPPING Co. Ltd. is a world-famous Korean shipping company, and specialises in both domestic and international moving, transportation, and storage. KMTCC Co. Ltd. and SINOKOR Co. Ltd. are popular Korean companies which provide a globally connected container liner service. Although the two companies are, respectively, small and medium shipping enterprises in Korea, they are known for their solid financial capability and ability to offer excellent shipping services.

Finally, the three freight forwarders used in this analysis are the following: SAMMIN Co. Ltd., HIGHWAY LOGISTICS Co. Ltd., and KOOK YANG LOGITECH Co. Ltd. Despite the fact that the three samples are small sized forwarding companies which have less than fifty employees, they are all leading companies in Korea which offer global forwarding services with firm financial capability.

The interviewees consist of the presidents or general/assistant managers from each company. As members of higher management, the interviewees have a rich knowledge of their operations and strategies. Thus, they are able to provide excellent answers to the interview questions, and can discuss the research questions while providing a wide range of insight into the overall market situations in the Korean maritime industry.

6.2.3 Interview Questionnaire

The aim of the interviews is to investigate the following aspects: (i) the influence of co-operative networks among maritime operators on knowledge acquisition; (ii) the influence of co-opetition in the network on knowledge acquisition; and (iii) the effectiveness of the acquired knowledge in improving maritime logistics value.

A questionnaire for the interview principally consists of open-ended questions. But if the contents of a question were in need of further explanation to facilitate easy comprehension, questions using the five-point scale of rating were asked again on the same subject.

Table 6. 1 Profiles of the Interviewed Companies

Type of Company	Code	Name of the Company	Age of Business	Number of Employees	Title of the Interviewee	Types of Business Origin
Port Terminal Operators	TO1	HANJIN PACIFIC CO., LTD.	4 years	135	Manager/ Planning & Marketing	General port-terminal operations
	TO2	KOREA EXPRESS CO., LTD.	44 years	9,845	General Manager/ Container Business Team	General port-terminal operations
	TO3	SEBANG CO., LTD.	44 years	882	Assistant Manager/ Planning Team	General port-terminal operations
Shipping Lines	SL1	HYUNDAI SHIPPING CO., LTD.	33 years	2,174	Assistant Manager	International sea transport of container cargoes by ships
	SL2	KMTC CO., LTD.	59 years	550	General Manger/ Business Strategy Team	International sea transport of container cargoes by ships
	SL3	SINOKOR CO., LTD.	20 years	229	General Manager/ Business Team	International sea transport of container cargoes by ships
Freight Forwarders	FF1	SAMMIN CO., LTD.	7 years	50	General Manager/ Marketing Team	International freight forwarding
	FF2	HIGHWAY LOGISITCS CO., LTD.	6 years	35	President	International freight forwarding
	FF3	KOOK YANG LOGITECH CO., LTD.	7 years	38	General Manager	International freight forwarding

For example, when exploring the importance of knowledge in enhancing maritime logistics value, the interviewees were asked the following open-ended question: ‘Do you think that market-specific knowledge is important in providing logistics services and improving logistics value, and why do you think this knowledge is important?’ And they were then asked once more about the same subject but in a more structured manner: ‘please indicate the extent of the importance of the market-specific knowledge that is specified as follows (from 1= least important, to 5= most important)’: general information about maritime transport industry, e.g. new trends, business culture or practice of the market, and governmental regulations of the industry; customer demands on a firm’s service; and strategy and behaviour of competitors.

The interviewees were also asked several additional questions which are not proposed in the conceptual framework, but instead reflect on other significant business aspects of the field. This was done in order to understand the relevant overall circumstances of the Korean maritime logistics industry, and to allow for further in-depth discussion with the interviewees on the research issue. Those questions include the following: (i) the environmental challenges that the maritime transport operators consider seriously; (ii) the necessity for strategic change under the given the environmental challenge; (iii) the significance of maritime logistics value as a new strategic goal; and (iv) the importance of knowledge for maritime logistics value.

The questions in their entirety are described in Appendix 1.

6.2.4 Process of Face-to-Face Interview

Generally, a pilot test helps the interviewees to comprehend and easily answer the questionnaire. As it enables a researcher to establish more correct questions for the concepts being studied, the pilot study also contributes to improving the construct validity of the research method, which represents the extent to which the concepts being studied are accurately measured.

Taking into account the above advantages of a pilot test, two practitioners were used for the pilot test before performing the main interviews with maritime logistics companies. One practitioner is a general manager for SINNOKOR Co. Ltd., and the other is a competent researcher who works in the Korean Maritime Institute (KMI). Both of the

practitioners have a broad view on and understanding of the maritime strategy in Korea, so they were able to discuss the research issues and provide valuable comments on the questionnaire.

After performing the pre-test, the interview was then conducted. As stated in the previous section, a total of nine companies (including 1 pilot company) responded to the interviews. A semi-structured questionnaire with a standard format (with multiple choice and open questions) was used.

The interviews were performed from April to May 2008. The researcher went to the interviewees' companies to meet them, and all of the interviews were conducted on a face-to-face basis. Full notes of the interviews were taken and then typed into the researcher's PC immediately afterwards. Before performing the interview, the researcher asked the interviewees' permission to make a tape recording of the interview. Five of the interviewees agreed to have the interviews recorded, but the others refused due to both confidentiality and personal reasons. Each interview lasted between 40 and 100 minutes.

When it comes to interpreting the responses, the interview data was examined and analysed for recurring themes and issues that emerge from the separate cases (Miles and Hubermann, 1994). For example, all data relating to the theme of 'do you think that acquired knowledge is helpful in improving the logistics value?' are grouped together, and then compared and summarised with all of the responses across the cases.

6.3 FINDINGS FROM THE INTERVIEW

As stated above, the questionnaire consists of two parts. The first part entails general questions that aim to comprehend the current patterns of Korean maritime operators that relate to the research topic, such as: the necessity of strategic change; the significance of maritime logistics value as a new strategic goal; and the importance of knowledge for maritime logistics value. The second part of the questionnaire deals with questions that are related to the exploration of the assumed relationships of the conceptual model, i.e. the source of knowledge acquisition, knowledge acquisition and knowledge application performance.

6.3.1 Current Environmental Challenges

Interviewees were asked the following question: ‘Do you think the environmental changes in your operation (e.g. larger-sized vessels, intense competition, increasing business costs, alliances of shipping lines, operational modernisation, privatisation of ports, and global expansion of port terminal operators) are serious and the challenges affect your business? Please indicate how serious you think the following environmental challenges are’: (from 1= least serious, to 5= most serious).

Most of interviewees replied that the above components of environmental challenges are generally significant, and affect their business activities in various manners. The interviewee from SL3 pointed out the seriousness of enlargement of vessel size by mentioning the following:

“Korea’s shipping companies are struggling, as several big shipping enterprises with powerful financial capability are continuously making their vessel size larger, with the aim of reducing business costs through an effective economy of scale. The trend has become the most fearful business threat for most small and medium enterprises like us, because we cannot afford to increase our vessel size to the same levels as the big enterprises, and we therefore cannot compete with them in both price and service. Under these circumstances, we need to determine an innovative strategy that will allow us to overcome this threat and differentiate our service”.

The interviewee from SL2, which is a small and medium sized company like SL3, expressed the same difficulties as the above. The emergence of larger sized vessels is also perceived by all of the maritime logistics companies as a serious environmental challenge. As a few large enterprises (e.g. Hanjin, Hyundai, APL and Cosco) are enlarging their vessel sizes by over 8000 TEUs, most maritime operators are looking for a way to respond to this threat. For example, the emergence of larger sized vessels is regarded as a big burden for port terminal operators. The interviewee from TO2 and TO3 said that the enlargement of the vessel size has pushed them to invest heavily in increasing the terminal capacity, and implementing the full automation of operating systems and manless high-tech equipment, in order to efficiently and productively handle the huge amount of cargoes that has ensued. The enlarged vessel size has also

been an environmental threat for freight forwarders, since the freight forwarder is the party who has to fill the space of the vessel.

Strategic alliances and integrations of shipping lines is also a significant environmental threat for maritime operators. The interviewee from SL3 noted that:

“The conglomerate which consists of collaborating shipping companies pushes small and medium enterprises like us into altering the sea-lane, or into developing a new course and way of business in order to avoid direct intensive competition with the giant group. I think we need to provide more specialised services in regards to certain regional sea-lanes in order to provide more differentiated services”.

The increase in negotiation power of shipping lines through strategic alliance becomes a serious environmental threat for port terminal operators, and this threat then forces port terminal operators to improve their services in scope and quality. According to the interviewee from TO1:

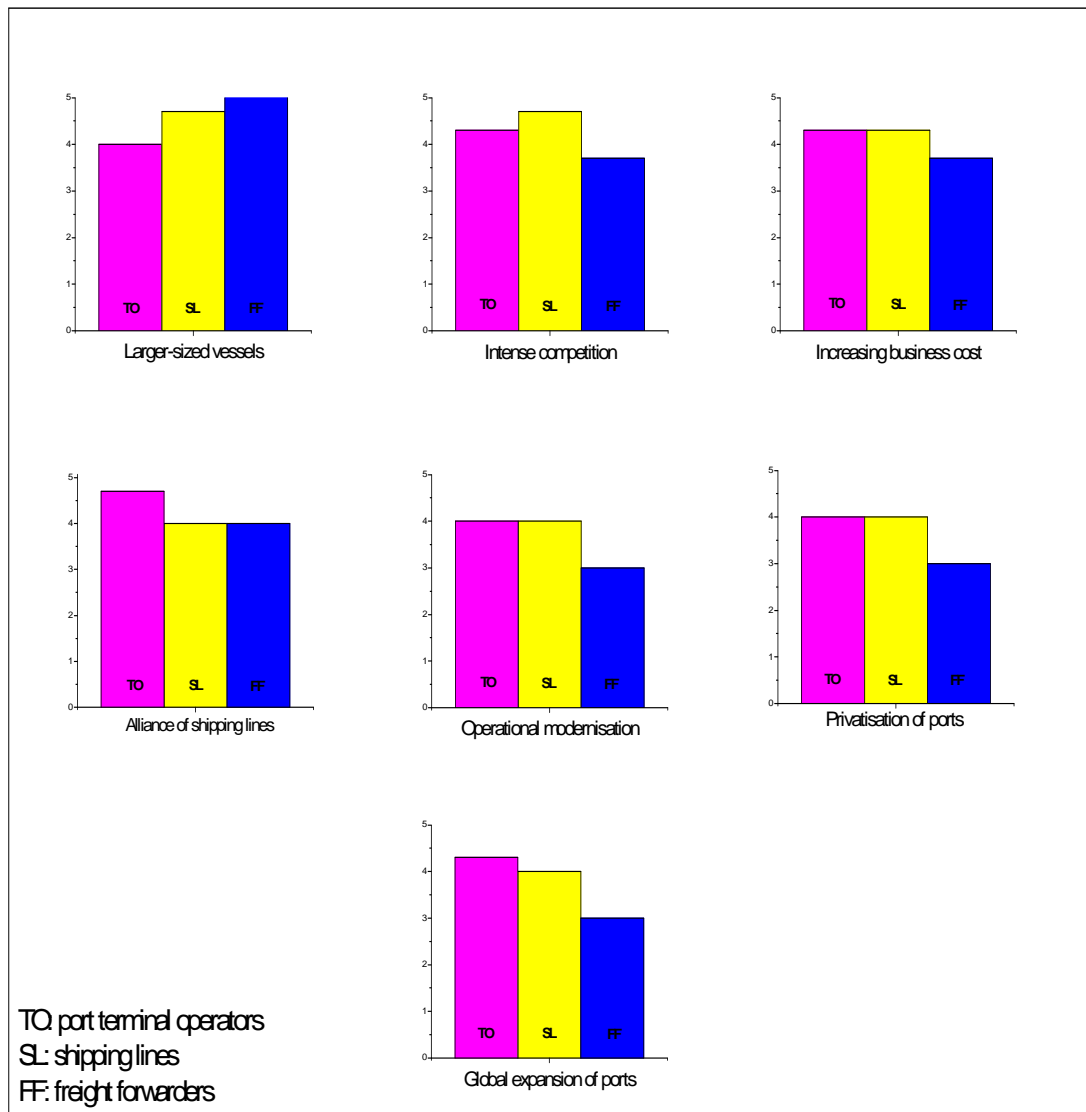
“Shipping lines that cooperate, thereby ensuring a high customer power, have made us reconsider the source of competence in order to satisfy the customer. Under the current environment, the cost-effective strategy no longer guarantees a high profit. Unless the differentiated service does not support our operation, we may lose our big customers who seek both various and high qualified services.”

In addition, all of the interviewees from the freight forwarders agreed that the increase in business cost is also a significant environmental challenge, since it causes a great number of managerial errors in financing, providing differentiated service, and responding to the various demands of their customers. The increasing business cost is a common consideration of the changing business environment for all of the maritime operators. The interviewee from TO2 pointed out that:

“As the rental cost of using space at the port and additional cost to respond to customer demands are getting higher, we must look for other innovative breakthroughs to reduce our costs and to survive in the industry.”

After getting subjective opinions on the environmental challenges which maritime operators are confronted with by asking open-ended questions, more structured forms of questions measured with five point of numerical scales are then asked of the interviewees, regarding the environmental changes which are listed in the early part of this section. Figure 6.1 summarises the answers of the respondents by calculating the mean values of the answers from the interviewees.

Figure 6. 1 Environmental Challenges



As seen in Figure 6.1, the results indicate that most of the components of environmental challenges listed in the questionnaire affect the various areas of maritime business

operation to a significant extent, as most of the mean values of the responses indicate above 4.0 or to 5.0. However, three components, i.e. operational modernisation, port privatisation and global expansion of ports, may not be very serious points for freight forwarders to consider. The reason for this may be due to the fact that those environmental changes do not directly affect freight forwarding operations, since they do not directly participate in moving or handling cargoes with vessels. Rather, they play an inter-mediate role of an agency of shippers. Yet despite the relative unimportance of such components, all of the interviewees from shipping and ports agreed that those environmental changes may nonetheless have a significant influence on their business, by affecting the general industrial growth or managerial behaviours in the market.

6.3.2 The Necessity for Strategic Change

Given the dynamic environmental conditions as outlined above, the question of whether it is necessary for maritime operators to change their strategy was initially explored, by asking “do you think your company needs to change the existing strategy or develop a new strategy under the dynamic environmental conditions?” This question aims to verify the significance of a suggestion for a new strategic direction to maritime operators.

All of the interviewees strongly agreed on the necessity of a new strategic direction in order to both cope with the current environmental challenges they confront with and improve their performance for their survival in the market. The interviewee from TO 2 addressed the following concern:

“The main problem we have faced so far is the excessive competition with other port terminal operators, because there is an unnecessary amount of port terminal operators in one port (i.e. here Busan Port). In order to compete effectively, we cannot help reducing our charge for handling cargoes, sometimes even into the level of some financial losses. Given these circumstances, we are seeking out new strategic alternatives, such as investing in innovative high-tech equipments, in order to differentiate our services. But I don’t think these solutions can guarantee a sustainable competitive advantage, due to the easy possibility of imitation from other rivals. Thus we need to develop another good strategic option.”

From the above answer, it is evident that maritime operators feel serious pressure to win their respective competitive business battles, and as a result of this they are eagerly seeking out a new strategic direction. The necessity for strategic change also stems from the logistical demand on maritime operators. The interviewee from TO1 mentions that:

“We are also forced by our customers to offer several integrated logistics services. For example, today’s customers require us to develop high-tech logistics-complexes around ports. The logistics-complexes may provide a multi-functional warehouse, special purpose of storage system, general port construction, container port bridge, shipbuilding engineering service, empty container yard, and can also serve as an easier connection to inland transport system and a multiplex for freight drivers. Such a demand implicates that the provision of a simple cargo handling service can no longer meet our customers’ needs and demands. Thus, we need to change our strategy to focus more on various and differentiated logistics services in order to improve our logistical value.”

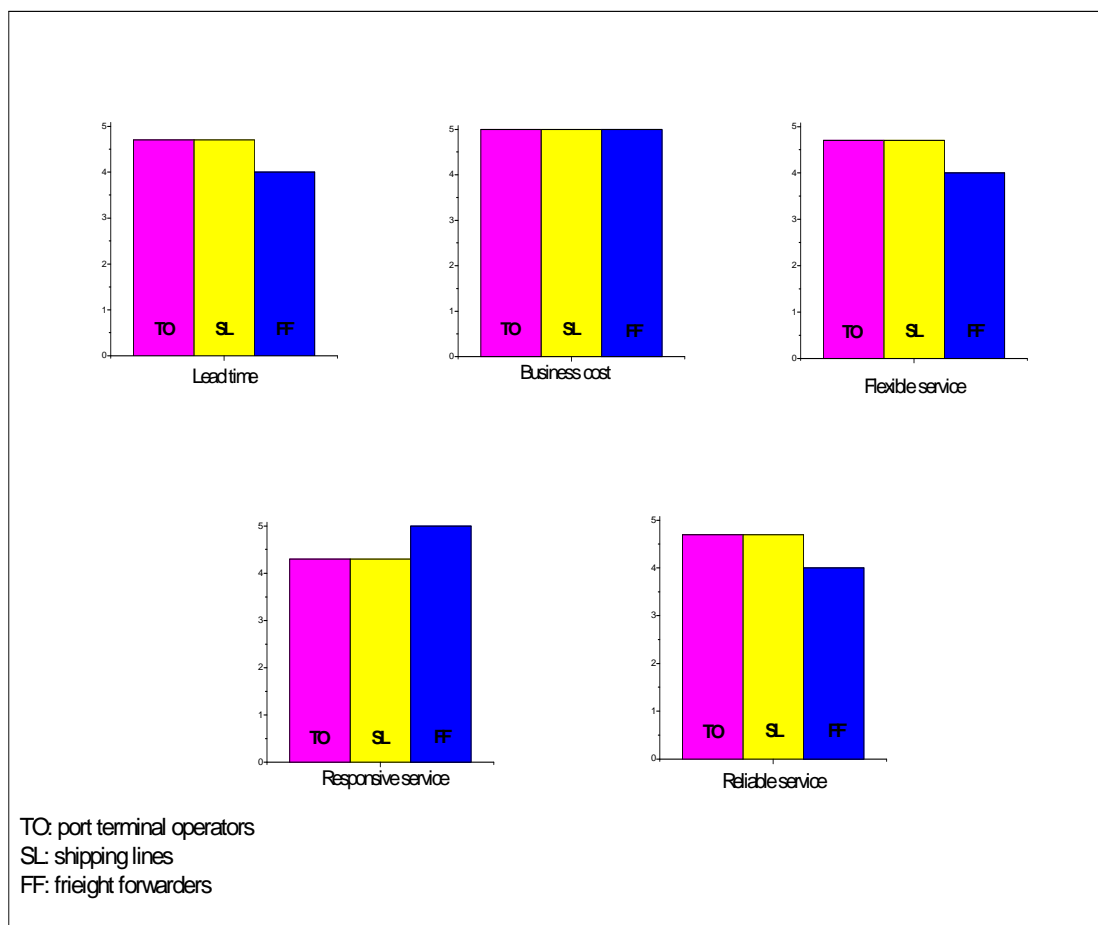
With the above replies, as identified in the literature review in Chapter 3, it is acknowledged that maritime operators recognise the necessity of strategic change, and also need a systematic direction or option which they can pursue in the future in order to flexibly cope with the current environmental challenges and changing customer demands and leverage their managerial profits. Following this, in the next question, the interviewees were asked about what factors would be important to consider in coping with the aforementioned logistical demands, and in improving their competitiveness. Once these factors are determined, interviewees can then choose which strategic objective they would like to follow.

6.3.3 The Significance of Maritime Logistics Value

This section aims to identify the significance of maritime logistics value in successfully coping with the current environmental challenges and surviving in the competitive marketplace, and justify its value as being the most considerable strategic objective of maritime operators. As stated in Chapter 3, the maritime logistics value is referred to as the extent to which a maritime logistics system fulfills the logistical demands through

successfully managing the flow of goods and information in maritime logistics. Based on research into the existing literature, the maritime logistics value is regarded as the new strategic objective for maritime operators. This study suggests two indicators which reflect on the maritime logistics value: (i) reduction of lead time and business costs and (ii) improvement in service quality (e.g. flexibility, responsiveness and reliability). In this section, the interviewees are asked whether the maritime logistics value is substantially significant in fulfilling the current demands on their business, and whether it deserves to be a new strategic objective.

Figure 6. 2 Importance of Maritime Logistics Value



When the pilot-test was initially conducted, the researcher asked the interviewees about the significance of maritime logistics value to their work, without giving any structured examples. But the interviewees had some difficulty in fully understanding exactly what maritime logistics value means. After having been given the explanation about the terms and concepts of maritime logistics value, the interviewees could comprehend and

address the strategic importance of maritime logistics value. Thus, in order to provide further clarity in the main interviews, the interviewee was given an explanation and provided with the five components that reflect on the maritime logistics value.

The interviewees were asked ‘do you think the following factors (i.e. time, cost, flexibility, responsiveness, reliability and others) are important in coping with the logistical demands, and help to improve the competitiveness of your company? Please indicate the extent of their importance (from 1= least important, to 5= most important).’ If the components are regarded as very significant in fulfilling the current environment’s business demands on their operation, the elements may reflect well on the maritime logistics value. Thus, the components then deserve to be valuable factors of their strategic objective that the individual companies should pursue.

As depicted in Figure 6.2, most of the mean values of the factors are above 4.0 and close to 5.0. The results indicate that all of the interviewees regard those indicators of maritime logistics value as very important for their business.

The business costs, which include all of the costs incurred in operating and managing a given company, are regarded by all the companies as the most important factor in helping to fulfill their customers and improve their performance. The interviewee from SL1 mentioned that as the business cost is directly associated with the service price to customers and their profit structure, they always place emphasis on the reduction of the cost, while at the same time pursuing a service differentiation strategy.

Accordingly, the interviewee from TO3 said that:

“I think the most important factor which enables us to be competitive is to offer the lowest possible price. Thus, we just concentrate on eliminating wasteful activities and extra costs in order to leverage all the resources and then reduce our costs and price.”

The lead time in operating and processing business procedures is also regarded as a significant factor of maritime logistics value. All the interviewees mentioned that the need for quicker service to customers is steadily increasing, which then places a large burden on the companies who provide these services. The interviewee from TO2 noted that:

“We worry that the cycle of production is increasing in rapidity, since the goods may quickly become old-fashioned if they are not sold before rivals launch better items. Such a business trend affects the logistics system to a great extent, as it forces us to handle and deliver goods as quickly as possible, so as to reduce stock level in warehouses. In this respect, the time factor is very important - not only for our port terminal operations but also for the entire logistics system”.

Flexibility of service is the “adaptation to unexpected operational circumstance” (Boersox, Closs and Stank, 1999, p. 42). It is related to an agility of the companies’ service when unplanned or unexpected things happen to them. The importance of flexible service was also strongly supported by all the interviewees in maritime logistics value. The interviewee from TO1 said that:

“In the maritime industry, there are industry-specific difficulties of natural conditions such as the weather conditions of storms, wind or wave, and sometimes safety accidents can happen at our workplace. Thus, in order to ensure the smooth flow of cargoes, we must be always prepared to respond flexibly to emergent accidents or unexpected circumstances.”

Responsiveness of service is the “accommodation of unique and/or unplanned customer requirements” (Boersox et al., 1999, p. 42). All of the interviewees addressed the significance of their responsive services. The interviewee from SL1 mentioned that:

“As customer needs get complicated and fastidious, there is an increase in small-sized multiple ordering, rather than the ordering of large quantities at once. Such a customer pattern has caused our shippers to be more demanding in using the shipping service. Thus we must respond to the various needs of our customers by offering more responsive services.”

The reliable service is referred to as the extent to which the service is provided consistently and reliably, in accordance with a planned schedule. The reliability also seems to be a crucial factor for the logistics value of maritime operators. The interviewee from SL3 said that:

“The reliability is deeply related to the strict control of the quantity of cargo, and also to keeping our schedules on time. If we lose our reliability, we may lose numerous opportunities to renew or make new contracts. Thus, when we offer our services and do certain works, we have to perform them in a reliable way at best. However, as we are always largely exposed to operational risks - defects of ships, unexpected problems in the ports where we are supposed to be tied at anchor, or bad weather conditions, for example - we have to make every effort to keep our service more consistent and trustworthy.”

In addition to the aforementioned factors of maritime logistics value, the interviewees expressed their opinions on other extra valuable components in maritime logistics value. For example, according to the interviewees from TO1 and SL2, an information system - such as the visual system which shows customers the whole procedure of the transportation and information flow from a departure to a final destination in real time - may be a crucial factor. Quick inter-connection with an inland transport system is also significant (according to the interviewee from FF1); a package service which integrates several multiple logistics activities by one company could be helpful (according to the interviewee from TO2); a cluster strategy among port terminal operators and other maritime operators can be a useful strategic alternative (according to the interviewee from TO3); and a cargo security is important for the logistics value (according to the interviewees from both TO3 and SL3).

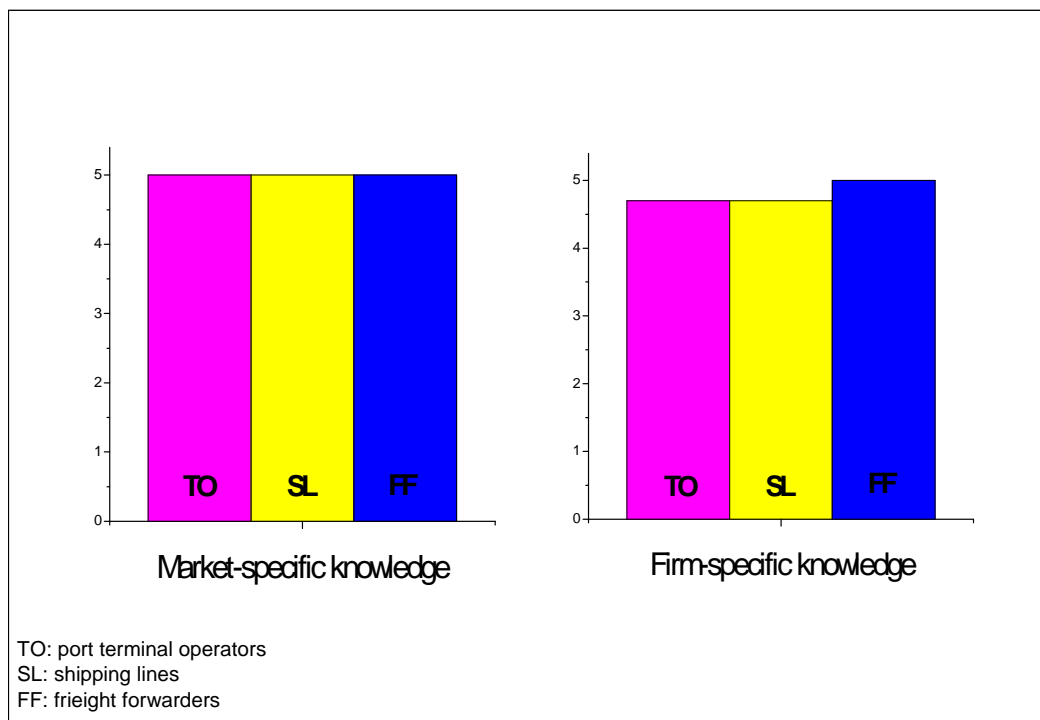
6.3.4 The Importance of Knowledge for Maritime Logistics Value

In this section, the importance of knowledge in enhancing maritime logistics value is examined. This aims to justify whether a knowledge-based strategy would be a good strategic alternative for maritime logistics value. The interviewees were initially given the explanation of the concept of knowledge and knowledge management, which is a chosen strategy that could be helpful in improving maritime logistics value. The interviewees were then given the following illustration on the specific types of maritime logistics knowledge, i.e. market-specific knowledge and firm-specific knowledge. As described in Chapter 5, market-specific knowledge is referred to as useful information and know-how of the industry and market, such as general information about the maritime transport industry (e.g. new trends, business culture or practice of the market,

and governmental regulations of the industry), customer demands on a firm's service, and strategy and behaviour of competitors. Firm-specific knowledge encompasses a certain operational technology, employees' experience and expertise, and organisational know-how about practices or procedures, such as operational skills or information technology, overall skills of managing employee and organisation (e.g. employee education or training), and marketing related know-how.

The interviewees were then asked the following: 'Do you think that (i) market-specific knowledge, and (ii) firm-specific knowledge are important in performing logistics services and improving maritime logistics value? Why do you think this knowledge is important?' They were then asked: 'Please indicate the extent of the importance of the market-specific knowledge/ firm-specific knowledge (from 1= least important, to 5= most important) for maritime logistics value.'

Figure 6. 3 Importance of Knowledge for Maritime Logistics Value



As shown in Figure 6.3, the interviewees generally shared the opinion that the two types of knowledge help to improve the maritime logistics value, since all of the mean values of the two components are above 4.5 or close to 5.0. Although they are not well aware of the concept of knowledge or knowledge management strategy, they stated that the

two types of knowledge may allow companies to comprehend the rapidly changing business conditions, and flexibly respond to customer needs. They also stated that should this knowledge be available, they would be very interested in acquiring and making use of it.

The interviewee from SL2 said that:

“Actually, we are not familiar with the academic term, knowledge and knowledge management, and have little idea as to whether we apply the knowledge management system to our business operation. But the important thing is that we are always looking for new information about changing business patterns and volatile customer demands. I think such information may be classified as market-specific knowledge. Sometimes we try to get other firms’ know-how, which may be included in the firm-specific type of knowledge, in order to imitate their best practice. Such efforts may be due to the fact that that sort of knowledge is crucial to survive in the industry as well as to improve maritime logistics value.”

Whereas the SL2 did not have full understanding of what the knowledge management system is and how it is processed within its organisation, the SL1 mentioned that the company has tried to apply the system to their operations with the recognition of the importance of knowledge management. According to the interviewee from SL1:

“Our company has recognised the significance of knowledge and knowledge management, and has made an effort to adopt such a system to our business. Our company encourages employees to share new information or knowledge between themselves and small groups or organisational units. I think that market-specific knowledge is essential in catching up on current business trends, as well as being essential to forecasting new trends or strategic behaviours of our competitors. As far as firm-specific knowledge is concerned, I think it is also very crucial to the enhancement of our competitiveness, by enabling us to focus on the development of organisational capability.”

SL2, which is one of the most globally popular shipping companies, has been distinguished by its proactive investment into the knowledge management system in Korea. For example, the company adopts various types of knowledge management

infra-systems at both inter-firm and intra-firm levels, such as the B2B (business to business) EDI or ERP system, and the intra firm knowledge sharing system. Through those systems, they can efficiently share knowledge both between organisations or between units within an organisation, and can therefore effectively utilise the acquired knowledge in their business. This may support the usefulness of knowledge in maritime logistics operation.

TO2 also had the similar opinion as SL1 by stating that, although the level is still rudimentary, they have tried to adopt the knowledge management system to their operation in order to encourage their employees to share useful information and facilitate organisational innovation. Having drawn from the answers given by all of the interviewees, it was revealed that a few large enterprises such as TO1 and SL1, have been proactively adopting the knowledge management system. Most other enterprises, despite the fact that they have not fully recognised the concept of knowledge and knowledge management practice, have already carried out the system by searching for useful information and knowledge and then applying the knowledge to their business. In this sense, the interview may be seen as a good opportunity to remind them of the value of knowledge, and to point out where they have been putting knowledge management into practice even if they have done so unconsciously.

The responses in this section may thus implicate that knowledge and knowledge management strategy may enable maritime operators to solve the strategic tasks that currently face them, and therefore enhance maritime logistics value. In the next section, the issue of whether the maritime operators acquire useful information and knowledge through inter-organisational relationships, e.g. co-operative networks and co-opetition in the network, will be examined.

6.3.5 Sources of Knowledge Acquisition

With reference to the sources of knowledge acquisition of maritime operators, the following inter-organisational approaches are adopted: (i) co-operative social network embeddedness, and (ii) co-opetition in the network.

- **Co-operative Networks and Knowledge Acquisition**

Prior to the examination of the effectiveness of network embeddedness on knowledge acquisition of maritime operators, the following issues will be initially explored: (i) whether maritime operators cooperate with each other in the same business; and (ii) whether the co-operative relations are multiply embedded in the social networks by having strong and dense ties with each other; and (iii) whether they acquire useful information and knowledge through the co-operative networks is then examined.

Co-operation of Maritime Operators

The extent to which companies engage with inter-organisational co-operation was initially investigated through asking the interviewees the following question: ‘Does your company cooperate with other market participants in the same business, through formal co-operation agreements, such as strategic alliances, joint ventures, and inter-organisational consortium, or informal co-operative relationships such as informal meeting or associations?’

All of the interviewees replied that they are all engaged in co-operative relationships with other companies in the same business, and these relationships may take formal or informal forms.

All of the interviewees from shipping lines mentioned that the most popular form of co-operative relationship may be the ‘shipping consortium’, which allows them to: tune their duplicated or excessive shipping schedule and distribute an efficient shipping schedule; strike a balance between the demand and supply of shipping; and escape direct intensive competition among rivals. They also establish other forms of formal co-operation, such as common marketing agreements in foreign markets, agreements on common usage of information systems, and sometimes they temporarily make special provisions as the needs arise. In addition, they also establish informal forms of co-operation such as personal meetings among employees, which contributes to the development of closer relationships among competitors.

The interviewees from port terminal operators noted that as the competition with their direct rivals in a same port is extremely tough, they more or less hesitate to proactively cooperate in a long-term based formal manner. Rather, they are more likely to cooperate with their competitors through short-term temporary contracts or associations, or

through informal meetings between employees. For instance, the interviewee from TO1 mentioned that:

“Due to the intensive competition with our rivals in the same port, we do not have many formal long-term co-operative contracts with our direct rivals. However, we sometimes ally with them for short-term contracts for temporary needs, such as common usage of piers, or sharing the facilities of quay cranes, stackers and special container freezing storage during times of an emergent traffic congestion. We also cooperate with competitors when jointly bidding for a usage of ports. But the co-operative relations among employees from different companies are active, and they frequently attend personal meetings or associations.”

The interviewee from TO3 also said that:

“We cooperate with other companies in the form of short-term contracts for mutual benefits when necessary. We also attend regular meetings of membership organisations such as the Korea Port Logistics Association (KOPLA) and the Korea Port Stevedoring Association (KPSA). This is done in order to contact other companies in the same business. In addition, we often meet other managers and practitioners of our competitors informally, through such events as dinner or meeting for a drink, where the mood is very relaxed and comfortable.”

Freight forwarding companies also seem to join their own co-operative relations, but the co-operative pattern tends more to that of the informal or short-term based, like that of port terminal operations. The interviewees from the three forwarding companies answered that they try to cultivate mutual profit by joining popular associations such as the Korea International Freight Forwarding Association (KIFFA) and the International Federation of Freight Forwarders Association (IFFFA), as well as having various informal gatherings.

The answers in this section indicate that most of the maritime operators in Korea generally co-operate with other companies in the same business, but the tendency towards co-operation is somewhat different in different business sectors. Shipping lines are co-operating with each other more proactively than the other two types of operators,

since they tend to participate in formalised and long-term based co-operative relationships, while port terminal operators and freight forwarders are more likely to co-operate with each other in more informal and short-term based ways.

Co-operative Networks of Maritime Operators

After this, the interviewees were then asked the following question: ‘Are the co-operative relationships embedded in social networks by forming multiple ties with each other rather than independent dyadic ties?’ This was done to investigate whether the maritime operators are embedded in co-operative social business networks. All of the interviewees replied that the co-operative relationships are all multiply inter-connected with each other in both direct and indirect manners, and most of the individual strategic behaviours of companies within a network may be known to all, for other entities rapidly affect the activities of other firms, even those that a given firm may not be directly linked with. With the aforementioned information, it seems that the maritime operators are embedded in their co-operative business networks.

When it comes to network density of maritime operators, the interviewees were asked ‘how many companies does your company cooperate with in the same business?’ Unfortunately, most interviewees could not answer the exact number of their co-operative relations. They could, however, provide an outline of the number. It was revealed that shipping lines have a tendency to cooperate with a great number of companies in the same business. The interviewee from SL2 said that:

“Our company affiliates over ten companies in Korea such as Kookyang Shipping, Chokang Shipping, Hansung Line, Kookyang Total Logistics, YJC International, LNT, and Kyungpyung Total Logistics, in order to provide diversified logistics services, such as sea-, ground-, air- transportation, multimodal transportation, warehousing and container yard operations. But the numbers of the co-operation may differ depending on the regions our ships move to, which include China, Japan, Russia, Vietnam, Thailand, Malaysia, Singapore, the Philippines, and so on, since we proactively cooperate with local companies in order to reduce the uncertainty about foreign markets and learn local business practices.”

The interviewee from SL1 also mentioned that the company is not only a member of TNWA (The New World Alliance), one of the most popular world-wide alliances, but also cooperates with a great number of other foreign companies in various forms of contracts. Such a result reflects well on the discussion in Chapter 3, which describes how Korean shipping lines are generally vigorously co-operating with each other through the formation of strategic alliances, consortiums or other informal methods.

In contrast to the co-operative tendency of shipping lines, port terminal operators and freight forwarding companies seem to have less co-operative relations. For example, all of the interviewees from the port terminal operators answered that they do not have a lot of formal long-term co-operative relationships with their direct competitors, but instead, they have a lot of informal co-operative connections with them, and with other operators, such as stevedoring companies, who are not in direct competitive relationships in the same business. As identified in Chapter 3, despite the fact that port terminal operators try to co-operate with each other in order to lessen the disadvantages stemming from extreme competition, these efforts may not lead to the undertaking of formal co-operative contracts.

All the interviewees of freight forwarding companies revealed the similar pattern of network density to that of port terminal operators. The interviewee from FF1 addressed that:

“As far as the number of co-operative relationships is concerned, as the competition of the industry is tough, we do cooperate with only a small number of companies in the business when the need arises. But informally, we have a lot of cooperators and we love to meet them in an informal way to talk about our business.”

The other interviewees of freight forwarders expressed similar opinions. These answers indicate that the numerical extent to which Korean freight forwarders co-operate with each other is not very high. These answers may reflect the specificity of freight forwarders in Korea. As identified in Chapter 3, Korean forwarders, unlike foreign global freight forwarders, are slow to co-operate with one another, and generally hesitate to establish broad strategic alliances or joint ventures in their business.

In order to assess the tie strength in the network, the interviewees were then asked about the closeness of the co-operative relations. In the case of shipping lines, they generally keep close relationships with one another, as all of the interviewees of shipping lines replied that the employees contact each other frequently whenever there is need, and converse about their operations.

With reference to the port terminal operators, despite the fact that all the operators in the same port know each other very well due to a small numbers of companies joining the port terminal operating business, they do not keep in touch with each other frequently. The reason may be due to the fact that their competition is very tough in the same port. The interviewees from freight forwarders also mentioned that they are generally not very close to their cooperators, and stated that they meet irregularly only when the needs arise.

From the above answers, the density and closeness of ties in the co-operative networks appear the highest in shipping lines; on the other hand, the extent of tie density in port terminal operations and freight forwarding companies seems to be relatively lower than that of shipping lines.

Co-operative Networks and Knowledge Acquisition

The interviewees were asked about the extent of knowledge sharing with co-operating companies in the networks through asking the following questions: ‘Do you think that co-operative networks have a positive effect on your knowledge acquisition?’, ‘Do you think that the stronger co-operative relationships have a positive effect on your knowledge acquisition? Why do you think this is the case?’, ‘Do you think that a higher number of co-operative relationships have a positive effect on your knowledge acquisition? Why do you think this is the case?’, and ‘Please indicate the extent to which the co-operative networks have a positive effect on knowledge acquisition (from 1= having a strong negative effect on knowledge acquisition, to 5= having a strong positive effect on knowledge acquisition).’

As seen in Figure 6.4, all of the mean values of the responses are above 4.5 or close to 5.0. The results indicate that maritime operators’ co-operative networks with other participants in the same business have a positive effect on knowledge acquisition. The interviewee from SL3 mentioned that:

“Our company gains a great deal of information through both formal and informal co-operation. For example, when we talk to each other by meeting, email or telephone, we share useful information or knowledge about general industrial trends or outlook for our customers, i.e. shipping, and the competitors’ strategy and behaviour.”

All other interviewees expressed similar opinions to the above answer. This indicates that co-operative network relationships generally have a positive influence on the knowledge acquisition of maritime operators. This result is consistent with the previous evidence that highlights the role of a co-operative network in facilitating knowledge sharing between players in the network (Powell et al., 1996).

The interviewees from shipping lines also replied that both the close and great numbers of co-operative relationships promote efficient information sharing amongst each other. The interviewee from SL3 also mentioned that:

“We have a lot of co-operative partners and establish very close relations with them. We also often communicate with our partners through various forms of official conferences, assemblies, and private gatherings. Such relationships allow us to exchange a lot of information about our business.”

Other interviewees from shipping lines expressed similar thoughts on this question. Thus, their answer implies that the density and strong ties of a network may promote knowledge acquisition of shipping lines.

The interviewees from port terminal operators had similar opinion. The interviewee from TO1 said that:

“I think more co-operative relations enable us to be exposed a larger flow of new information and useful knowledge; consequently, this larger flow then means that we can achieve a great deal of knowledge that is useful to our company.”

The above answer reveals that the port terminal operators can get a lot of knowledge if they establish more co-operative relationships in the network. This answer is interesting,

because although the interviewees from port terminal operators mentioned that they don't have a lot of formal or long-term based co-operative relations, they think they can get a lot of knowledge from the larger number of co-operative relations. It may therefore be thought that despite the generally low network density of port terminal operators' formal and long-term based co-operative relationships, and regardless of whether the relationship is formal or informal and long- or short- term based, if the port terminal operator has a lot of co-operative ties, the firm can gain a lot of knowledge from the co-operative network relationship. The interviewees of freight forwarders, whose tendency toward the co-operative network is similar to that of port terminal operators, also expressed the same opinions as those of the port terminal operators.

In relation to the effectiveness of strong ties on knowledge acquisition, all the interviewees from both port terminal operators and freight forwarders answered that they can acquire a lot of knowledge from the close partners in their co-operative network. The interviewee from FF2 said:

'There are a few close partners which we contact and meet frequently. We can talk about our business and share some useful information in the market or industry at those meeting. Thus, I think such close relationships may be helpful in acquiring knowledge of the partners.'

As discussed in Chapter 4, the existing literature indicates that structural and relational network embeddedness promotes vigorous knowledge sharing between actors in a network. As players in a dense network are exposed to faster and more efficient flows of knowledge, they can easily acquire other players in a network; and a firm with a strong relationship with other entities in a network can gain useful information from the others by enabling the firm to create mutual trust and have two-way communication (Grantovetter, 1985). Thus, the responses in this section may support the contention of the previous literature.

In summary, the co-operative networks of maritime operators may have a positive influence on the knowledge acquisition of maritime operators, and the network density and tie strength also positively affect the knowledge acquisition.

- **Co-opetition in the Network and Knowledge Acquisition**

In order to explore the relationship between co-opetition in the networks as the second source of knowledge acquisition, the extent of the competitive appearance of maritime operators was initially examined by asking ‘how do you think of the extent of competition in your business?’

As stated in previous sections, all of the interviewees from the port terminal operators answered that they compete very intensively with port terminal operators within the same port. They also recognise the possibility of competition with port terminal operators in other ports, but this is not as large a concern, as they rarely compete with them directly.

All of the interviewees from the shipping lines answered that the extent of the competition in their operations is generally very high, and in particular, they compete more with the companies that have regionally similar sea-ways. The interviewees of freight forwarders mentioned that as they connect shippers and shipping lines, the competition of their operations usually follows the shipping lines’ competitive pattern, which is also intensive depending upon the similarity of regional sea-lanes, and the extent of the competition is generally high. All of the answers of the interviewees imply that all the types of maritime operators intensively compete with each other in the same business.

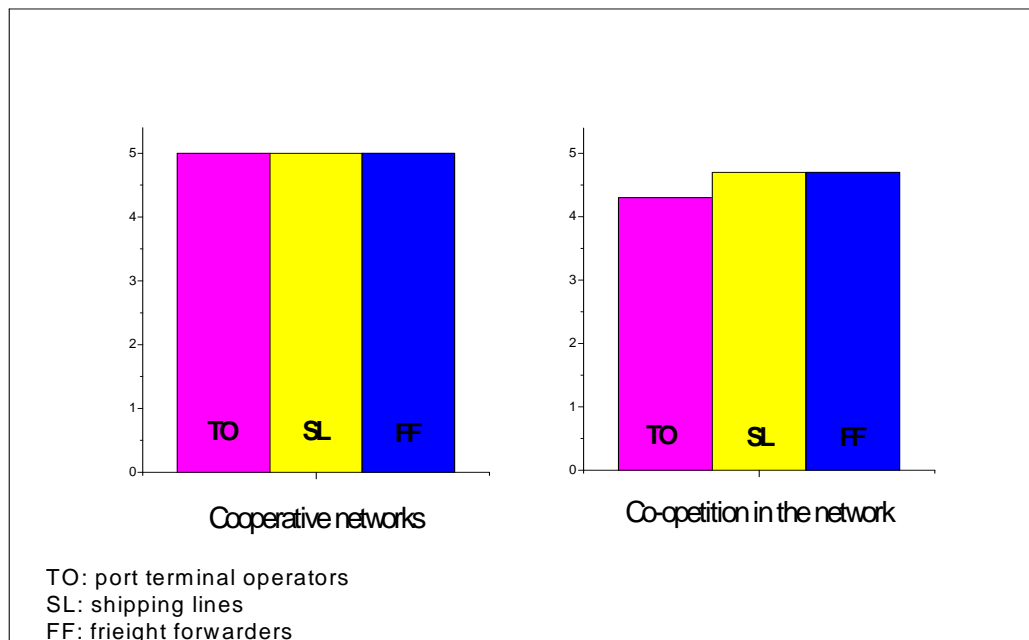
After specifying the pattern of competition of maritime operators, the interviewees were asked these questions: ‘Do you think that knowledge acquisition through co-operative networks is facilitated more when you are competing with each other, rather than when you are not?’, and ‘Please indicate the extent to which the co-opetition in the network has a positive effect on the knowledge acquisition (from 1= having a strong negative effect on the knowledge acquisition, to 5=having a strong positive effect on the knowledge acquisition)’. These questions could help to identify whether the competition could positively affect the knowledge acquisition through their co-operative networks.

As seen in Figure 6.4, the mean values of the answers on the above question are over 4.0. Such a result reveals that most interviewees agreed on the positive effect that competition in the co-operative network has on knowledge acquisition. In other words, they could gain useful information and knowledge when they are simultaneously co-operating and competing, rather than when they only focus on one or the other.

For example, the interviewee from SL1 stressed the role of co-opetition in the network in acquiring knowledge from their competitors through saying that:

“Superficially, the competition per se may impede knowledge sharing with other companies in the co-operative business network. Of course, it is too difficult to immediately achieve all the knowledge we wish to acquire, thus, we may or may not get other firms’ knowledge. But, if we think further, the competition may facilitate our desire to acquire the competitor’s knowledge. I think, in the case of our company, that the desire to acquire knowledge by competition results in a positive effect on the knowledge acquisition.”

Figure 6. 4 The Positive Influence of Co-operative Networks and Co-opetition in the Network on Knowledge Acquisition



It has been identified in the previous section that all of the maritime operators acquire a lot of knowledge from their co-operative network relationships. According to the above answer, the company may acquire more knowledge from the co-operators when the competition with the co-operative partners is simultaneously high. To be more specific, the competition of the shipping company with its co-operative partners may stimulate the incentive of knowledge acquisition, and the shipping company may thus be more

enthusiastic to acquire the competitors' knowledge. This answer indicates that the competition may therefore facilitate the effectiveness of co-operative networks on knowledge acquisition.

All the interviewees of freight forwarders and port terminal operators, apart from one company, also expressed similar views to the SL's thought. These answers may support the previous findings which indicate that competition facilitates knowledge sharing with co-operative partners (Tsai, 2001). Thus, the co-opetitive practice of maritime operators may help to acquire knowledge in a co-operative network.

However, there was a different opinion regarding the positive effect of co-opetition in the network on knowledge acquisition. The interviewee from TO1 expressed that:

“We hesitate to open our own know-how or useful information to our competitors, and we just try to catch up with the other companies' know-how or information. But in reality, it is very difficult to only achieve the competitors' informational resource; consequently, we cannot acquire a great deal of knowledge of the companies who are more intensively competing with us.”

From the above answer, it is evident that extreme competition among port terminal operators may hinder vigorous sharing of knowledge between competitors. In this respect, it is expected that knowledge acquisition is facilitated if a mutual transaction is made on the basis of companies being open and friendly, in order that they can then share their knowledge through implementing a win-win strategy. As this answer offers a different view to the other responses, it may give room for further discussion about the positive influence of co-opetition in the network on knowledge acquisition.

In summary, the positive influence of co-opetition in the network on knowledge acquisition was generally supported by most of the interviewees, but sometimes the extreme competition may be an obstacle that impedes the amicable transferring of knowledge between organisations in the same business.

6.3.6 Knowledge Acquisition and Maritime Logistics Value

As a final part of the interview, knowledge acquisition performance was explored by asking all the interviewees these questions: ‘Do you think that knowledge acquisition may have a positive effect on (i) operational efficiency: i.e. reducing lead time and business costs, (ii) improving service effectiveness: i.e. flexibility, responsiveness and reliability?’, and ‘Please indicate the extent to which the acquired knowledge has a positive effect on maritime logistics value (from 1=having a strong negative effect on maritime logistics value, to 5=having a strong positive effect on maritime logistics value).’

All of the interviewees mentioned that the acquired knowledge plays a significant role in reducing lead time and business costs, and in improving service flexibility, responsiveness and reliability. Figure 6.5 summarises the answers from the interviewees on the positive relationship between knowledge acquisition and maritime logistics value by the mean values. As seen in the figure, all of mean values are above 4.5 or 5.0, which indicates that the positive influence of knowledge acquisition on maritime logistics value is strongly supported by the interviewees.

Looking at the answers carefully, the interviewee from SL1 mentioned that:

“We share rich information on our customers as well as general knowledge of our industry with other companies through the co-operative network. The knowledge shared through co-operation helps to quickly respond to market needs, quality improvement and aggressive marketing. Thus, knowledge sharing is crucial for survival in the industry.”

The above answer indicates that knowledge acquisition may help to improve the responsiveness and flexibility of their service. Thus, the result may support the previous literature which addresses the role of knowledge acquisition in improving organisational flexibility and responsiveness (Subramaniam and Venkatraman, 2001).

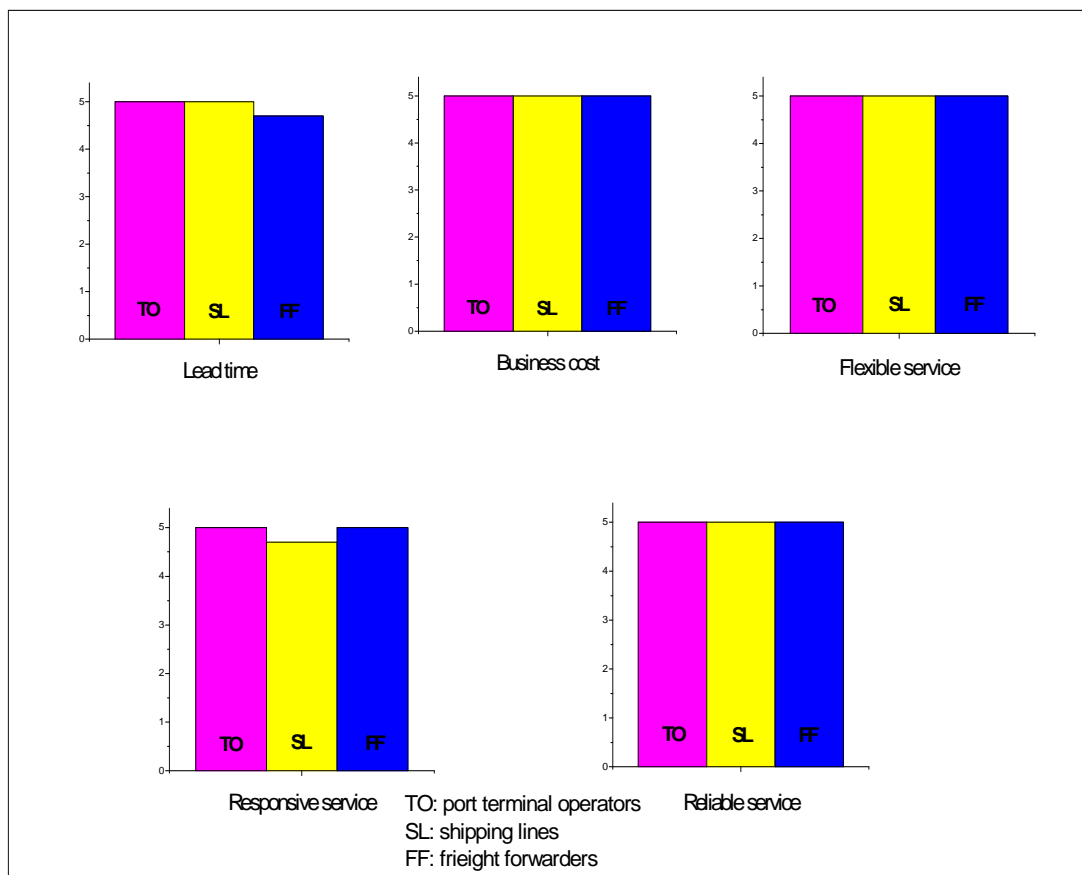
The interviewee from FF3 also mentioned that:

“We apply knowledge such as other firms’ know-how, or operational skills, to our own business. This knowledge is acquired through our co-operative and co-

opeitive relations, and the application of this knowledge helps to develop innovative ideas on reducing our costs.”

The above answer supports the positive influence of knowledge acquisition on reducing business costs. This is consistent with the previous evidence which highlights the effectiveness of knowledge management in improving operational efficiency by reducing business costs (Sachez, 1996).

Figure 6. 5 The Effectiveness of Knowledge Acquisition on Maritime Logistics Value



The interviewee from TO1 emphasised the importance of a firm’s know-how on the customer’s needs, through addressing the following:

“We sell our operation service to shipping lines with fixed spaces, and we usually have to cope with the behaviour of shipping lines. Therefore, it is very important to know various bits of information on our customers, such as the size of shipping

lines which come to us, or the extent of their satisfaction on our service quality, in order to improve the efficiency and effectiveness of our service. Knowledge acquisition and application can play a key role in enhancing maritime logistics value. In addition, as we also continue to expand our port terminal operation into a number of countries, information on local conditions or governmental regulations in foreign ports, or other investment-related information at local markets, etc., is crucial to our strategic decision making. All these activities can also be facilitated by making better use of the acquired knowledge.”

The interviewee from TO3 stressed that:

“As there are few differences in service qualities provided by port terminal operators, we are always looking for innovative operational skills and unique services which enable us to differentiate our operation from that of our rivals. Such capability may be developed by proactively acquiring and creating valuable knowledge, and by applying the acquired knowledge to our business through our employees’ educating/training system. Actually, we have not realised the clear and visible performance from the causal relationship between knowledge acquisition and application, but we ensure that the knowledge acquired through co-operative networks may promote our innovation and differentiated competences.”

The above two answers indicate that the acquired knowledge from other firms facilitates the more efficient and effective business activities of maritime operators. Thus, it strongly supports the importance of knowledge acquisition in maximising maritime logistics value which has been stressed by the previous literatures (Wu and Chou, 2007; Subramniam and Venkatraman, 2001).

Having recognised the above opinions of the interviewees, it is believed that knowledge acquisition through co-operative and co-opetitive networks may have a strong positive influence on the enhancement of maritime logistics value.

To briefly sum up, maritime operators’ current pattern of knowledge acquisition and application performance were examined through interviewing managers from the maritime companies in Korea. These interviews have identified the following several points.

- (i) *Environmental challenge and the necessity of strategic change*: all of the maritime operator interviewees expressed that they are confronted with a dynamically changing business environment. As such, they see the necessity of changing their strategy in order to both manage the threats derived from this uncertain environment, and also to improve their logistics value and competitive advantage.
- (ii) *The significance of maritime logistics value*: the five factors of maritime logistics value (i.e. lead time, business cost, flexible service, responsive service, and reliable service) are noted by all of the interviewees to be significant factors in coping with today's demands on maritime operators and improving their competitiveness. Therefore, maritime logistics value may be seen as an important strategic objective for maritime operators.
- (iii) *The importance of knowledge for maritime logistics value*: the two types of knowledge, e.g. market-specific knowledge and firm-specific knowledge, are regarded by all of the interviewees as being essential to the enhancement of maritime logistics value.
- (iv) *The extent of co-operative network embeddedness*: shipping lines are the most proactive in being densely and strongly embedded in co-operative networks in the same business, in that they actively participate in co-operative relationships with their competitors by establishing a great number of ties in both formal and informal ways, and the closeness between ties are generally strong. In contrast to the shipping lines, while port terminal operators and freight forwarders also form their own co-operative business networks, they are more likely to cooperate with their direct rivals through short-term based forms or other, more informal ways. In addition, the extent of network density and tie strength is not very high.
- (v) *Co-operative networks and knowledge acquisition*: all of the interviewees agreed that their companies are gaining useful information and know-how through the co-operative networks. This result is consistent with the previous contention in business management, which addresses the role of co-operative networks in facilitating inter-organisational knowledge exchange. Thus, this explorative study ensures that the companies operating in the maritime business may also keep in mind the significance of effectively managing their co-operative relationship in order to maximise their informational benefits.

- (vi) *Co-opetition in the network and knowledge acquisition*: it was revealed that the competition in the co-operative network generally promotes the knowledge acquisition of maritime operators through stimulating the wish to gain other firms' valuable know-how and expertise. But there appeared a possibility that the extreme competition may hinder the smooth transfer of knowledge between actors in the network. This result supports the previous literatures in co-opetition strategy. This implies that maritime operators may also gain knowledge-based benefits from their competitive tension, and thus they should seek to determine how they successfully manage their competition with other firms in order that they may minimise the damage and maximise the benefits from the competition.
- (vii) *Knowledge acquisition and maritime logistics value*: all of the interviewees agreed that the acquired knowledge has a positive effect on the enhancement of maritime logistics value, by allowing for both a reduction in time and business costs, and the improvement of service quality, i.e. responsiveness, flexibility and reliability. This result verifies that knowledge-based strategy would be one of the best strategic alternatives for maritime operators to maximise maritime logistics value.

The above explanation can be summarised as Table 6.2, which shows the frequency of agreed responses.

6.4 SUMMARY

This chapter conducts an explorative case study to clarify whether maritime operators in Korea follow the pattern of acquiring knowledge through their co-operative and co-opetitive networks and whether they then improve maritime logistics value by applying the acquired knowledge. A total of nine interviewees from nine maritime logistics companies in Korea responded to the interview.

The evidence of the nine respondents' information generally supports the assumed relationship of the conceptual model established in Chapter 5. As this case study aims to identify an outline of the research model, a main analysis for the proposed model, i.e. the Delphi survey method, will be continuously conducted in the next chapter. The method will collect and analyse the opinions, gathered from a panel of experts in the

Korean maritime industry, on the research issues. The ideas and sources gained through the explorative case study may be reflected in the development of the questionnaire for the Delphi survey.

Table 6. 2 Summary of Interview Responses from the Nine Companies

Variables	Frequency of agreed responses
Environmental Challenge	
• larger-sized vessels	9
• intense competition	8
• business cost	8
• alliances of shipping lines	8
• operational modernization	6
• privatisation of ports	6
• global expansion of port	6
	9
The Necessity of Strategic Change	
The Significance of Maritime Logistics Value	
• lead time	9
• business cost	9
• flexible service	9
• responsive service	9
• reliable service	9
The Importance of Knowledge for Maritime Logistics Value	
• market-specific knowledge	9
• firm-specific knowledge	9
Positive Influence of Co-operative Networks on Knowledge Acquisition	9
Positive Influence of Co-opetition in the Network on Knowledge Acquisition	8
Positive Influence of the Acquired Knowledge on Maritime Logistics Value	
• lead time	9
• business cost	9
• flexible service	9
• responsive service	9
• reliable service	9

CHAPTER 7 THE DELPHI SURVEY ON MARITIME OPERATORS IN KOREA

7.1 INTRODUCTION

This chapter aims to empirically investigate the proposed relationships among co-operative networks, co-opetition in the network, knowledge acquisition and maritime logistics value. The Delphi survey method was used to analyse these relationships and to diagnose the effectiveness of knowledge management strategy in the Korean maritime logistics industry.

This chapter consists of the following parts. In the first part, the Delphi survey method is generally designed. Subsequently, a questionnaire for the Delphi survey is developed through operationalisations and measurements of variables. Finally, the empirical findings discovered through the results of the survey are discussed.

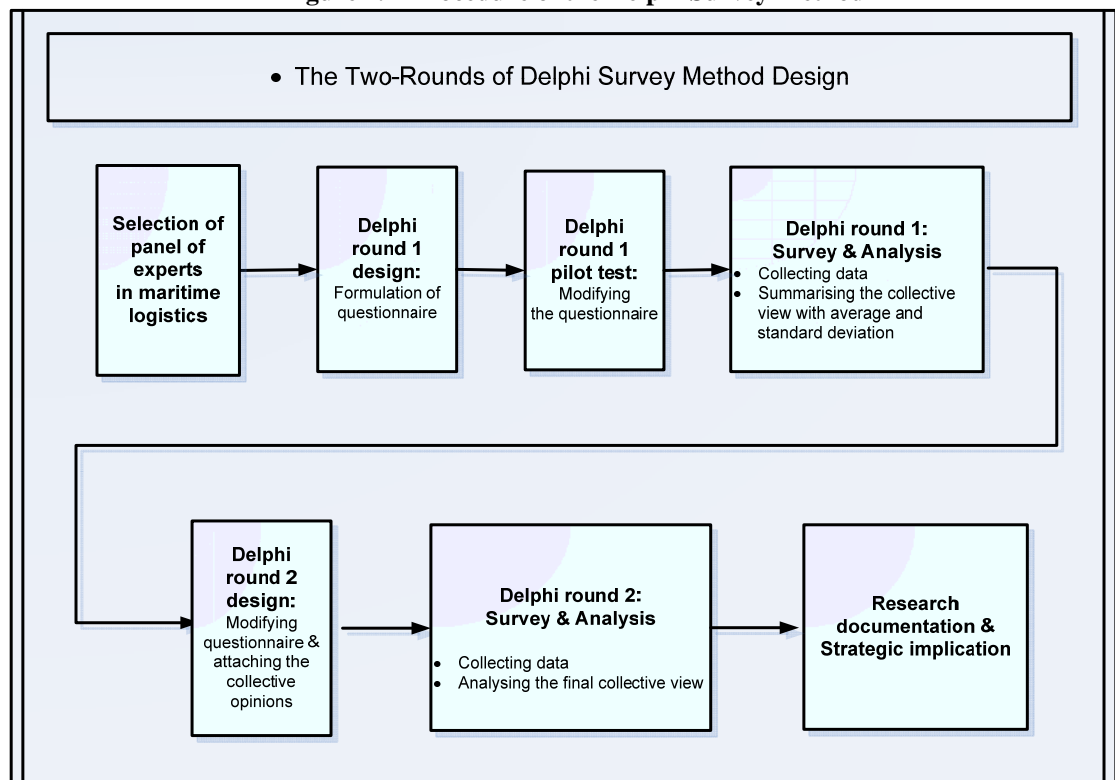
7.2 THE DELPHI SURVEY METHOD DESIGN

This study employs two-rounds of the Delphi survey method as the analytical tool to examine the conceptual model proposed in Chapter 5. The two rounds of Delphi survey in this study consist of the following procedures. Firstly, a questionnaire for the survey is formulated. Construct operationalisation is initially done, and the key variables are then measured. A questionnaire is developed based on the measurements of the variables. Subsequently, qualified panelists are selected on the basis of certain criteria to stand as experts in the Korean maritime logistics field, and they are then asked to discuss the practices in the Korean maritime industry according to the procedure set out in the questionnaire.

Thirdly, a pilot test on each question is conducted. This work allows the researcher to modify the questions which are unclear or difficult to comprehend, and to solve any possible procedural problems. Fourthly, the first round of survey is launched. The finally developed questionnaire is distributed to the panelists, and their responses are

then collected. After this, the collected data in the first round of the survey is initially analysed. The answers in the first round are summarised by using ‘mean values’ and ‘standard deviations.’ Once this is complete, the second round of the survey is launched. The questionnaire is re-sent to the panels, along with the information of the collective views of the first round of survey, and is then re-collected. Finally, the relationships of the conceptual model are examined by analysing the finally collected responses. Figure 7.1 depicts the procedures. The next section deals with the formulation of the questionnaire as the first stage of the procedure.

Figure 7. 1 Procedure of the Delphi Survey Method



7.3 FORMULATION OF QUESTIONNAIRE

When one formulates a questionnaire, the key variables should be identified (Collis and Hussey, 2009). This is then followed by operational definition (i.e. operationalisation) to measure the variables, and questions of the survey can then be developed. Operationalisation is defined as “the process of converting concepts into their empirical referents, or of quantifying concepts for the purpose of measuring their values, such as occurrence, strength and frequency” (Sarantakos, 2005, p. 139). Despite the fact that qualitative studies do not usually employ operationalisation (Sarantakos, 2005), this study, as mentioned in Chapter 5, develops numerically estimated questions, each of

which offers a brief explanation on the relevant concepts (i.e. the five-point scale). Thus, the operationalisation to measure the variables is needed before formulating questions for the survey. The process of operationalisation and measurement on the variables are followed.

7.3.1 Construct Operationalisation and Measurement

The key variables in this study are knowledge, inter-organisational network embeddedness (i.e. density and strength of ties), inter-firm competition and co-opetition in the network, and maritime logistics value.

- **Knowledge**

In this study, the knowledge of maritime operators is operationalised as ‘useful information or know-how for maritime logistics value’. As stated in the previous chapters, the two types of knowledge, i.e. market-specific knowledge and firm-specific knowledge, are considered as knowledge for maritime logistics value. Based on previous literature and the result of the explorative case study, this study operationally defines the market-specific knowledge as ‘useful information or know-how about the market where companies operate’. The market-specific knowledge is divided into the following three sub-levels: general information (e.g. new trends in the maritime transport industry, business culture or practice of the market, and governmental regulations of the industry); customer demands on maritime operators’ service; and competitors’ strategy and behaviours. The importance of knowledge is then measured by the five point scale of rating in order to “make it easier to interpret the results of the statistical analysis” (Collis and Hussey, 2009, p. 203). For example, when examining the importance of market-specific knowledge for maritime logistics value, the following question is asked to the panelists: ‘How important is the information and know how about general information (e.g. new trends in the maritime transport industry, business culture or practice of the market, and governmental regulations of the industry), in improving maritime logistics value? Please indicate the extent to which it is important, from 1= least important, to 5= most important. The full questionnaire is described in Appendix 2.

In a similar manner, the firm-specific knowledge is operationalised as ‘useful information or know-how which exists within a firm’. It is also sub-divided as follows:

operational skills or information technology (e.g. managerial information system, process reengineering system, and just-in-time or lean system); overall skills of managing employees and organisation (e.g. employee education or training); and marketing related know-how (e.g. promotion, price, distribution, and customer relationships management). And the importance of the operationalised knowledge is then measured by the five point scale of rating in the same way as the above.

- **Inter-organisational Co-operative Networks**

This section is about the extent to which maritime operators in Korea cooperate with each other in the form of social business networks and how densely and closely they are embedded in the network. As reviewed in Chapter 4, social network is defined as “a set of nodes multiply linked by social relationships” (Laumann, Galaskewicz and Marsden, 1978, p. 458). In order to measure the extent of formation of co-operative networks of maritime operators, the panellists are asked to indicate the extent to which they agree or disagree with the following statement (from 1= strongly disagree, to 5= strongly agree): ‘The firms in the same business cooperate with each other (e.g. strategic alliance, joint venture, associations, consortium, and informal meetings) through a network’.

A network density, being a structural variable of network embeddedness, is referred to as “the ratio of the number of ties actually observed to the number theoretically possible, thus, the greater the interconnectedness, the higher the density” (Grantovetter, 1976, p. 1288). Previous literature introduces the following two methods to measure the network density: the full network method and the ego-centric network method. The full network method calculates the density of a network by the accurate ratio of the number of ties within a network. But the method can be used only when “information about each actor’s ties with all other actors can be collected” (Liebowitz, 2005, p. 79). The ego-centric method measures a network density by the extent of how many ties the focal firm is connected to within its network. The ego-centric methods focus more on a focal node (i.e. ego)’s point of view, rather than on the network as a whole. Thus, the density may be different, depending on the focal firm’s perception (Hanneman, 2002; Liebowitz, 2005).

This study may not use the above two methods, because the panellists may not have accurate ideas on the full network ties of each of the business types, and in addition, the panellists are not a focal firm within a network but a third party who observe the

business network. Despite such difficulties in measuring the network density, the overall extent of the network density of each business can be identified by the experts of the panel, because they have a deep understanding about the pattern of maritime business. In this sense, this study measures the network density of maritime operators by asking ‘do you think a great number of companies join the co-operative network relationships? Please indicate the extent to which you agree or disagree with the statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree).’

In examining the tie strength of a network, this study operationally defines it as the frequency of interaction (Kraatz, 1999; Rowley, Behrens and Krackhardt, 2000; McEvily and Zaheer, 1999; Tsai, 2002), and the extent of inter-organisational commitment (Anderson and Narus, 1991; Holm, Eriksson and Johanson, 1999; Rowley, Behrens and Krackhardt, 2000). The frequency of interaction is measured by asking ‘do you think the co-operating firms in the network frequently keep in touch with each other? Please indicate the extent to which you agree or disagree with the statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree).’

The inter-organisational commitment is referred to as the willingness to invest in the relationships mentally and financially for long-term mutual benefits (Holm et al., 1999). Thus, the greater the inter-organisational commitment is, the stronger the tie is. The inter-organisational commitment is measured by asking the following two questions: ‘Do you think the firms invest a lot of money in the co-operative network relationships?’ (i.e. financial commitment) and ‘Do you think the firms consider the co-operative partners very important in their business and mutual interests? (i.e. mental commitment) Please indicate the extent to which you agree or disagree with the statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree).’

- **Competition in the Network**

This section measures the competitive patterns of maritime operators in the co-operative networks, aiming to examine the extent of co-opetition in the network of maritime operators. Previous literature captures the extent of inter-firm competition by the following two dimensions: external market competition and internal resource competition (Burt, 1987; Bartlett and Ghoshal, 1993; Chen, 1996; Bergen and Peteraf, 2002; Tsai, 2002).

External market competition

There have been many attempts to investigate the extent of external market competition among firms. For example, Tsai (2002) measures the external market competition as the extent to which two units offer similar products or services in the market place. If the similarity of products or services of two units is high, the extent of competition between them is regarded to be intensive. Chen (1996) defines competitors of a focal firm as “firms operating in the same industry, offering similar products and targeting similar customers” (p. 104). Thus, Chen (1996) views that if the products that firms offer and the customers targeted by the firm are similar, the extent of competition in a focal firm becomes high.

Burt (1987) introduces a structural equivalence concept to discuss the competition issue. Burt (1987) suggests that “the more similar ego’s and alter’s relations with other persons are- that is, the more that alter could substitute for ego in ego’s role relations, and so the more intense that ego’s feeling of competition with alter are- the more likely it is that ego will quickly adopt any innovation perceived to make alter more attractive as the object or source of relations” (p. 1291). Thus, the structural equivalence model assumes that if two actors have an identical pattern of ties with other actors in a network, they are structurally equivalent. Consequently, they tend to be more competitive (Lorrain and White, 1971). The concept of structural equivalence can be applied to the external market competition of firms. If two firms provide services to very similar customers, they lie in a structurally equivalent position. Thus, the firms will compete with each other in order to get a greater number of the overlapped customers.

The above studies indicate the similarity in product or service quality that firms offer, and customers which firms target is a key indicator of inter-firm competition in an external market. In this regards, this study measures the external market competition of maritime operators as the extent to which ‘the service qualities in the network are similar to each other’, and ‘the customers in the network are similar to each other’. The more similar the services and customers are, the more intensive the competition is.

Internal resource competition

Generally speaking, firms in the same business compete with each other not only in their external market but also with their internal resource. Strategic scholars, who adopt a resource-based theory, consider the nature of inter-firm competition in terms of

resource endowments (Barney, 1991; Peteraf, 1993). For example, Chen (1996) suggests the concept of resource similarity to examine inter-firm competition. Resource similarity is defined as “the extent to which a given competitor possesses comparable strategic endowments, in terms of both type and amount, to those of the focal firm” (p. 107). Chen (1996) suggests that firms with similar resource endowment are likely to compete with each other more intensively in the market place. Being inspired by Chen (1996), Bergen and Peteraf (2002) also regard the resource similarity as a significant indicator when identifying competitors of a focal firm.

With the above argument in mind, this study considers the resource similarity as an indicator of internal resource competition; namely, the more similar the resource, the more intensive the competition. The resource similarity is measured with the extent to which ‘the resources of maritime operators in the network are similar to each other.’ The resources are classified by the following three aspects: operational resources (e.g. facilities, equipment, and information system), quality of employees (e.g. the levels of education, skill, and knowledge or other ability to perform their job), and financial capability (e.g. funding ability or health of financial structure).

- **Inter-organisational Co-operative Networks and Knowledge Acquisition**

In order to investigate a positive relationship between co-operative networks and knowledge acquisition, the following questions are asked: ‘Please indicate the extent to which you agree or disagree with the following statements regarding your opinion, from 1= strongly disagree, to 5= strongly agree: the higher numbers of co-operative network relationships maritime operators have, the more useful information and know-how they acquire (i.e. the relationship between network density and knowledge acquisition); and the stronger co-operative network relationships maritime operators have, the more useful information and know-how they acquire (i.e. the relationship between strong tie and knowledge acquisition)’.

- **Co-opetition in the Network and Knowledge Acquisition**

Co-opetition is referred to as an interdependent relationship in which competition and co-operation simultaneously occur between two or more competitors (Luo, 2004; Tsai, 2002). In order to investigate the role of co-opetition of maritime operations in co-operative networks in acquiring knowledge, the extent to which competition in the network facilitates the positive influence of co-operative networks on knowledge

acquisition is measured (Tsai, 2002). If competition promotes such an influence, the positive interaction effect of simultaneous competition and co-operation on knowledge acquisition may be improved, and as a result, the effectiveness of co-opetition in acquiring knowledge in the network may increase (Tsai, 2002). The question for the item is: 'Please indicate the extent to which you agree or disagree with the following statements regarding your opinion, from 1= strongly disagree, to 5= strongly agree: the acquisition of useful information and know-how through the co-operative network is facilitated more when the competition is high.' The higher numerical value indicates the stronger impact of co-opetition in the network on facilitating the knowledge acquisition of maritime operators.

- **Maritime Logistics Value**

As stated in the previous chapters, maritime logistics value is reflected in operational efficiency and service effectiveness. Being efficient, which is related to the “how”, means to operate quickly with low costs. The effectiveness of service, which is related to the “what”, refers to the pursuit of a higher service quality (Baudin, 2004). Maritime logistics value in this study is operationalised as the extent to which maritime operators reduce costs and time (i.e. efficiency), and provide flexible, responsible and reliable services (i.e. effectiveness).

In order to examine a positive impact of knowledge acquisition on the enhancement of the maritime logistics value, the respondents are asked whether the acquired knowledge has a positive effect on reducing business costs (i.e. costs); reducing lead time, and providing services on time (i.e. time); providing customised services to their customers (i.e. responsiveness); flexibly responding to unexpected circumstances or volatile customer needs (flexibility); and providing accurate information to their customers, and providing safe services (i.e. reliability) (Lai, Ngai and Cheng, 2000; Song and Panayides, 2008). Table 7.1 summarises all of the variables and measurements in this study.

Table 7. 1 Variables and Measurements

Variables	Measurements	References
The importance of knowledge for maritime logistics value	<p><i>1. Market-specific knowledge for maritime logistics value:</i></p> <ul style="list-style-type: none"> the extent of how important the useful information or know-how about (i) general information (e.g. new trends in the maritime transport industry, business culture or practice of the market, and governmental regulations of the industry), (ii) customer demands on maritime operators' service, and (iii) competitors' strategy and behaviours, are in improving maritime logistics value. <p><i>2. Firm-specific knowledge for maritime logistics value:</i></p> <p>the extent of how important the useful information or know-how about (i) operational skills or information technology (e.g. managerial information system, process reengineering system, and just-in-time or lean system), (ii) overall skills of managing employees and organisation (e.g. employee education, and training), and (iii) marketing related know-how (e.g. promotion, price, distribution, and customer relationships management), are in improving maritime logistics value.</p>	Berdrow and Lane (2003) Ratten and Suseno (2006)
Inter-organisational co-operative networks	<p><i>Formation of inter-organisational co-operative network in the same business :</i></p> <ul style="list-style-type: none"> the extent to which the firms in the same business cooperate with each other (e.g. strategic alliance, joint venture, associations, consortium, and informal meetings) through a network 	Madhavan et al. (1998) Uzzi (1997) Kraatz (1999) Holm et al. (1999) McEvily and Zaheer (1999)
	<p><i>Network density:</i></p> <ul style="list-style-type: none"> the extent to which a great number of ties are actually observed in the co-operative network in the same business 	Grantovetter (1976) Madhavan et al. (1998)
	<p><i>Tie strength</i></p> <ul style="list-style-type: none"> frequency of interaction in the co-operative network the extent of mutual financial and mental commitment in the co-operative network 	Uzzi (1997) Kraatz (1999) Holm et al. (1999) McEvily and Zaheer (1999) Yi-Renko et al. (2001)
Inter-organisational competition in the network	<p><i>1. Internal resource competition</i></p> <ul style="list-style-type: none"> the extent to which a focal firm perceives its resource is similar to other firms in the network. <p><i>2. External market competition</i></p> <ul style="list-style-type: none"> the extent to which a focal firm offers the same services as other players in the network 	Lorrain and White (1971) Barney (1991) Peteraf (1993) Chen (1996) Burt (1997)

	<ul style="list-style-type: none"> the extent to which firms offer their services to the same customers 	Tsai (2002)
Co-operative networks and knowledge acquisition	<ul style="list-style-type: none"> The extent to which the higher numbers of co-operative network relationships maritime operators have, the more useful information and know-how they acquire (i.e. network density and knowledge acquisition) The extent to which the stronger co-operative network relationships maritime operators have, the more useful information and know-how they acquire (i.e. strong tie and knowledge acquisition) 	
Co-opetition in the network and knowledge acquisition	The extent to which the acquisition of useful information and know-how through the co-operative network is facilitated more when the competition is high: i.e. if the higher numerical value may indicate the stronger impact of co-opetition in the network in facilitating knowledge acquisition for maritime operators.	Tsai (2002)
Maritime Logistics Value	1. Business cost <ul style="list-style-type: none"> the extent to which their operation costs and service prices are lower than competitors 2. Lead time <ul style="list-style-type: none"> the extent to which their operation time is shorter than that of their competitors 3. Service flexibility <ul style="list-style-type: none"> the extent to which they respond flexibly to their volatile customer needs 4. Service responsiveness <ul style="list-style-type: none"> the extent to which they customise services to meet various customer needs 4. Service reliability <ul style="list-style-type: none"> the extent to which they provide accurate information to their customers the extent to which they provide safe services (i.e. minimising loss or damage of cargoes) 	Baudin (2004) Song and Panayides (2008)

Source: Compiled from various sources.

7.3.2 Formulation of Questionnaire

The above section has described construct measurements in order to develop questions for the Delphi survey. The full questionnaire in this study consists of five parts: the importance of knowledge in maritime logistics value; the co-operative network embeddedness of maritime operators; the competition in the network; the relationship between co-operative networks and knowledge acquisition; the relationship between co-competition in the network and knowledge acquisition; and the effectiveness of knowledge acquisition on maritime logistics value. Most of the questions have three parts of sub-questions according to the type of operators (e.g. port terminal operators, shipping lines and freight forwarders), in order that the panellists can answer the questions separately, depending on their different business types.

For example, when examining the positive impact of knowledge acquisition on reducing business cost, the following question is asked:

‘Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (1= strongly disagree, 2= disagree, 3= moderate, 4= agree, and 5= strongly agree).’

- Knowledge acquisition has a positive effect on reducing business costs.

	1	2	3	4	5
Port terminal operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Freight forwarders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A covering letter of the questionnaire includes the aim of the survey and how to complete the questionnaires. A draft of the English version of the questionnaire was reviewed by academics at the Logistics Research Centre of Heriot-Watt University, and the revised questionnaire is translated into Korean by the researcher. The questionnaire is drawn up in both the form of an online link, and a PDF document. The online link enables respondents to follow the link and immediately answer through the use of the one-touch click method. The PDF document was used when respondents preferred to answer directly on paper.

7.4 PROCESS OF THE DELPHI SURVEY

7.4.1 Panel of Experts

Selecting appropriate experts for a Delphi survey is most important, since their opinion directly reflects on the empirical results. “Experts” in this study are defined as people who are qualified with a deep insight and broad understanding on maritime logistics business and strategy in Korea. Thus, many years of working experience in the industry and professional knowledge or rich research outputs in the industry are needed in order for one to be included in the expert group.

When it comes to the number of working years, this study made a limitation of above three years of working to be the panel. The reason for this is that the person who has worked more than three years may get used to the work in the industry, and be capable of in-depth discussion about this research issue with his/her own views or opinions. As far as the type of organisation where the experts’ work is considered, researchers who work in universities and research centres under both public or private companies, and policy makers of government institutions within the maritime logistics field, are chosen as the experts of the panel; since they are regarded to be able to discuss the issue from both academic and practical points of view.

To be specific, at first researchers in universities in Korea, who have worked at the department relevant to maritime transportation and logistics for more than three years, are invited as the qualified panel. Most of those who responded to the survey are from the universities located at Busan and Incheon. The regional bias may be due to the fact that the two cities have world-famous ports, i.e. Busan Port and Incheon Port. The universities in those cities, such as Korea Maritime University, Pusan National University, Incheon National University and Inha University, perform a great number of various types of projects on maritime transport and logistics. Thus, the researchers of those universities have a great deal of experience in discussing the strategy or policy for maritime logistics, and suggesting good advice for the practitioners.

Secondly, researchers working in research centres of company (i.e. the Hanjin Logistics Institute) and government institutions (i.e. the Korean Maritime Institute and Busan Development Institute) in Korea are invited to join the panel. The Hanjin is a world-

famous company that provides excellent services in shipping and port terminal operating. The Korean Maritime Institute and the Busan Development Institute are also one of the leading governmental research centres in the Korean maritime industry. Thus, the researcher who works at these companies and institutions may have a pre-eminent role in analysing the current market situations, and establishing maritime strategies and future outlook. Such advantages would ensure that the individual deserves a place on the panel of experts.

Thirdly, staff who work at the Department of Maritime Affairs and Port Division in Korean government institutions, such as the Busan City Hall and the Busan Port Authority, are invited to join the panel of experts. The staffs who work at the Department of Maritime Affairs and Port Division of the Busan City Hall make important decisions on overall maritime transport industry in Korea. The Busan Port Authority is the institution that develops, manages and operates the overall political activities of Busan Port. Thus, the staffs at the above two institutions are very familiar with the overall policies and strategies of maritime operations in Korea.

Table 7. 2 Personal Information of the Panel

Type of organisation		Years of working in the organisation	
University	16	3-5	30
Research centre in company	4	5-10	4
Research centre under the government	14	10-15	7
Government institution	16	Over 15 years	9
Total	50	Total	50

However, managers of maritime logistics companies are excluded from the panel of experts group. During the case interview with company managers, it was revealed that the majority of the managers were not really engaging with the abstract terms of knowledge, knowledge management, social network and maritime logistics value. These managers therefore needed a detailed explanation from the researcher about each specific term, as well as guidance on how the terms related to the meaning of each particular question. As a result of this, it was decided that it may not be appropriate to include the managers in the expert group of the Delphi analysis, as the analysis is conducted through use of a survey method questionnaire without direct oral explanation by the researcher. Instead, it is believed that the more academic- or policy- centred participants, who make a systematic study of the patterns or practices of the industry in

order to deeply analyse those patterns and practices, or to form a governmental policy for the industry, and who are more likely to enjoy debating or discussing with other experts, would provide a better sample for the Delphi surveys, in which the participants are supposed to answer the questionnaire without the researcher's assistance. Further, it is believed that the opinions of the managers on the research issue have been fully reflected in the current study throughout the explorative case study, in which the respondents were given enough explanation about the questionnaire directly by the researcher.

The researcher initially invited a total of fifty-six experts who satisfied the above criteria to be the panel. A total of fifty-three people agreed to participate in the survey. But three of the fifty three were excluded from the data analysis, since there were several blanks on the questions.

Details of the information of the fifty panellists are summarised in Table 7.2, and Figure 7.2-3. The panelists who work in universities at or higher than the level of a senior lecturer position account for 32% of the total sample; in governmental institution, 32%; in research centre under the government, 28%; and the remaining 8% of the sample are derived from the research centre of the company. The vast majority of the specialists (60%) have worked in their respective organisations for 3-5 years; 15% of the sample for over 15 years; 14% of the sample for 10-15 years; and 8% of the sample for 5-10 years.

7.4.2 Non-response Bias

Non-response bias is referred to as the difference between the respondents and non-respondents who refuse to participate in the survey. The non-response may have a skewed impact on the research findings (Maylor and Blackmon, 2005). The non-response can be tested by several methods, such as the comparison of known values of the population, subjective estimates, or extrapolation methods (Armstrong and Overtion, 1977). However, the high response rate (i.e. ninety five percent) of this study may settle the potential problem of non-response bias or low response rate. The three people who were initially invited in the first round but refused to participate in the survey do not, compared to the respondents, have any distinguishing characteristics in their education,

organisational position, or working years. Therefore, the non-responses may not have any skewed impact on the research findings of this research.

Figure 7. 2 Types of Organisation of the Panel

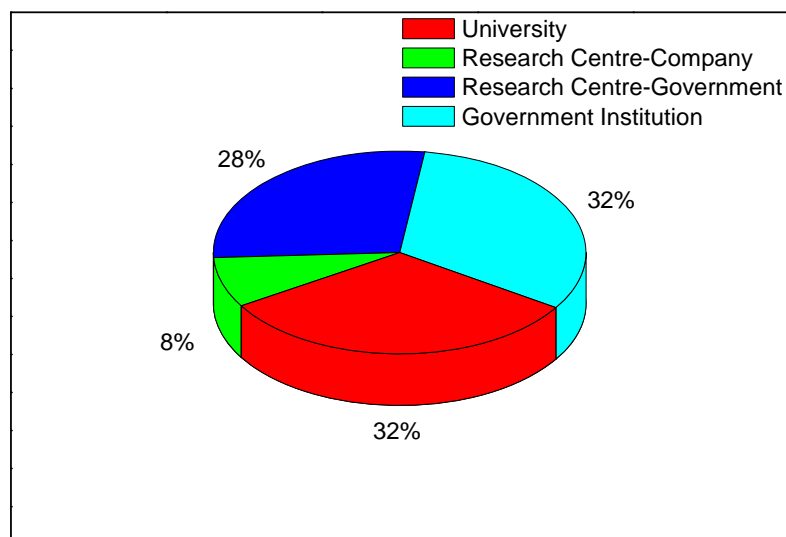
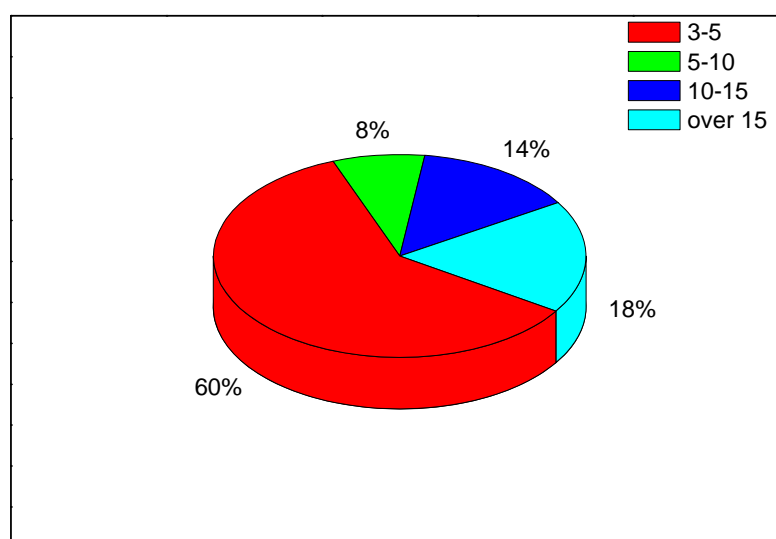


Figure 7. 3 Years of Working in the Organisation



7.4.3 Data Collection of the Delphi Survey

Before launching the first round of the Delphi survey, a pilot survey was performed in order to correct possible problems with the questionnaire. One person in each group responded to the pilot survey, making for a total of four experts. As all of the respondents could answer all of the questions without any serious difficulty, the researcher went ahead to the main survey with the questionnaire.

The first round of the Delphi survey took place between October and November 2008. As stated in the previous section, a total of fifty-six experts in Korea were invited to the survey. Those experts were approached by the researcher by calling or sending emails. They were initially given an explanation about the objective and the entire process of the survey, and were then asked to participate in the Delphi survey. A total of fifty-three experts agreed to take part in the survey. The majority of the respondents were given an online link by email, which enabled them to electronically complete the questionnaire by following the link. The researcher visited some panellists who preferred to meet and complete the paper-based questionnaire in person in order to directly collect their responses.

A total of fifty respondents, including the four responses collected from the pilot test, were used in the first round of the Delphi analysis. The online link method enabled the completed answers to be immediately processed in the electronic data pool. And the others, which were collected by a paper-based method, were typed and saved in the data pool by the researcher.

In the Delphi survey, the panellists are generally supposed to share other panellists' opinions on the questionnaire by being given summarised results of the previous round, and to reconsider the same questions again in the next round. In this research, based on previous studies on the Delphi survey, the group opinions in the first round of the survey were summarised by using the values of mean and standard deviation on each question (MacCarthy and Atthirawong 2003; Scholl, et al., 2004). The mean value (\bar{X}) is calculated by the following numerical formula.

$$\bar{X} = \frac{X_1 + X_2 + \dots X_n}{n}$$

The \bar{X} (i.e. the mean value) is calculated by the summing up of individual measurements and dividing the sum by the number of the data (n). The mean value indicates the extent of how the panelists think of the questions. The standard deviation (σ) is calculated by the following numerical formula.

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Lower case sigma means 'standard deviation'; capital sigma means 'the sum of'; and \bar{x} means 'the mean'. The standard deviation measures how widely spread the values in the data set are.

The value of mean and standard deviation of each question, as a collective view of the panel, is then attached when distributing the second-round of questionnaires to the panelists in order to enable the respondents to share with the participants and reconsider their initial thoughts. Generally speaking, as the rounds progress, a high decrease rate of the number of respondents appears in most Delphi surveys (Harrigan, 1985a; Scholl, Konig, Meyer and Heisig, 2004). In this study, as in previous Delphi studies, a total of thirty two judges, i.e. 64% of the panelists of the first round, responded to the second round of the survey. No special or systematic pattern was noted from the non-respondents of the second round. Considering the extremely hard working environment in the Korean maritime industry, the resulting 36% of non-respondent rate may be due mainly to the fact that most of the experts were just too busy with their work duties to answer the survey again.

The next section analyses the results of the responses of the two-rounds of the survey, based on the mean and standard deviation on each question.

7.5 FINDINGS FROM THE DELPHI SURVEY

The empirical results from the Delphi survey consist of the following three parts. The first part examines the importance of knowledge for maritime logistics value; the second part relates to inter-organisational relationship (i.e. co-operative networks and co-

opetition in the network) and knowledge acquisition; and the final part explores the positive relationship between knowledge acquisition and maritime logistics value.

The findings from the two rounds of the survey are presented all together, in order to easily compare the two rounds of results of each section of the questionnaire. The panellists answered the questions in a generally consistent manner between the two rounds, because the values of mean and standard deviation of the two rounds showed as mostly similar to each other. As both of the two stages of survey were processed in a stable environment, and no special or systematic pattern which may have affected the panelists' thought or opinions was noted during the two phases, these similar results may indicate that the participants were very confident about their response and therefore their views did not change over the two stages of the survey. In the case that certain significant differences in the answers between the two rounds are observed, the judgement on those answers was based on the result of the second round, which is composed of the finally refined opinions of the panel.

Most of the questions of the survey were measured by the 5 Likert scale, from 1= least important or strongly disagree (i.e. negative level), to 5= most important or strongly agree (i.e. positive level). When interpreting the group opinions of the Delphi survey by the mean values, generally speaking, there is no objective or statistically significant standard to evaluate the panellists' judgement. For example, like this research, Sun and Scott (2005) examine the extent of managerial impacts of certain variables in their Delphi survey by using the 5 Likert scale method. When interpreting the Delphi results, they categorise three levels of impact with the mean values of the responses: low impact (below 3), moderate impact (between 3 and 3.75) and high impact (greater than 3.75). In McKinnon and Forster's (2000) research, without any principle like Sun and Scott (2005) in interpreting the results, the respondents' range 3.7-4.0 of average rating was interpreted as strong influences. Thus, it seems that the judgement from the numerical results depends on the subjective view of the researcher.

With the above discussion in mind, this study provides the following subjective standard in interpreting the mean values of the responses. The mean values are categorised into three levels of interpretation: negative (below 2.5), moderate (between 2.5 and 3.5) and positive level (above 3.5). Such a way of interpreting is based on the fact that mean value, being above 3.5, is rounded off in decimal points to 4.0 (4=

important or agree in the questionnaire) or 5.0 (5= most important or strongly agree); between 2.5 and 3.5 is rounded off to 3.0 (3= moderate); and below 2.5 is rounded off to 2.0 (2= unimportant or disagree) or 1.0 (1= least important or strongly disagree).

The values of standard deviation of the two rounds of survey are almost the same, or slightly higher/lower in certain questions of the second round than the first round. The goal of the Delphi survey of the current study aims not to drive a consensus of experts' thought but to gather their various opinions and diagnose the effectiveness of knowledge management strategy in maritime logistics. Thus, the gap of standard deviation between the two rounds may not cause any problem in interpreting the results or suggesting strategic direction for maritime operators. Rather, the standard deviations may help us to understand the degree of distribution of responses.

7.5.1 The Importance of Knowledge for Maritime Logistics Value

The first section examines the importance of knowledge for maritime logistics value. All of the panellists were asked to determine the extent to which the market- and firm-specific knowledge is important for maritime operators in improving maritime logistics value. The results from the two rounds of the survey are summarised in Table 7.3 with the means and standard deviations (SD) of the responses. Figure 7.4 depicts the result of this question.

In the first round, the panellists gave higher scores to most of the six categories of knowledge. The means of the five categories of knowledge (i.e. MK1, 2 and 3, and FM1 and 3) represent above 4.0. In particular, the mean of the knowledge about customer demands on their service (MK2) is the highest of all. The value of standard deviation of this is also relatively low, which means the deviation of opinions of the panellists is low. The mean value of FK2 (i.e. skills of managing related know-how) is 3.9, in very close proximity to 4.0. Thus, the FK 2 is also regarded as an important knowledge for maritime logistics value.

In the second round, as the results are similar to those of the first round, the mean values of the two types of knowledge are generally high. All of the mean values of market-specific knowledge are above 4.0, suggesting that the market-specific knowledge is assessed as significant in improving maritime logistics value. Other components of

firm-specific knowledge are also regarded as important, as all of their mean values are above 3.5 and close to 4.0. Notably, the mean of MK2 is the highest, while its standard deviation is the lowest of all. Therefore, the knowledge of customer demands on maritime operators' service is regarded as the most important knowledge for maritime logistics value.

Table 7. 3 The Importance of Knowledge for Maritime Logistics Value

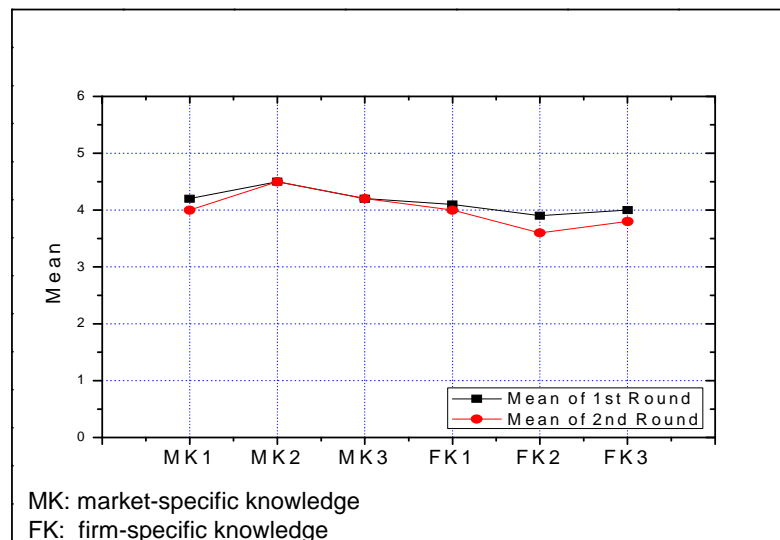
Section I Knowledge for maritime logistics value		Q: How important is the following information or know-how in improving maritime logistics value? Please indicate the extent to which it is important, from 1= least important, to 5 = most important.	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
Market-specific knowledge (MK)	MK1	General information (e.g. new trends in the maritime transport industry, business culture or practice of the market, and governmental regulations of the industry)	4.2	.65	4.0	.90
	MK2	Customer demands on maritime operators' service	4.5	.65	4.5	.67
	MK3	Competitors' strategy and behaviours	4.2	.71	4.2	.87
Firm-specific knowledge (FK)	FK1	Operational skills or information technology (e.g. managerial information system, process reengineering system, and just-in-time or lean system)	4.1	.68	4.0	.73
	FK2	Overall skills of managing related know-how (e.g. employee education, or training))	3.9	.76	3.6	.75
	FK3	Marketing related know-how (e.g. promotion, price, distribution, and customer relationships management)	4.0	.68	3.8	.76
		Total	n= 50		n= 32	

Note: SD = standard deviation

The results of this section are consistent with the findings from the explorative case study in Chapter 6, as they indicate that knowledge is highly appraised as a crucial component in improving maritime logistics value. Market-specific knowledge may be essential in improving understanding on current business trends and volatile customer demands, as well as forecasting new trends or strategic behaviours of competitors. In particular, knowledge of customer demands (MK2) was regarded as the most significant factor for maritime logistics value. This implies that maritime operators consider customer satisfaction to be one of the most important elements in coping with the current challenges and surviving in the market place.

Despite the relatively lower overall score that it received, firm-specific knowledge is also necessary in order to catch up on other firms' sources of competitive advantage and improve firms' internal capability. As firm-specific knowledge supports the firm's internal activities (Berdrow and Lane, 2003), this knowledge may be essential for maritime operators to develop internally embedded competency and differentiate their services from those of other firms. Therefore, acquiring and applying knowledge may help maritime operators to enhance their maritime logistics value. The results in this section may support the previous contentions which stress the importance of market- and firm-specific knowledge in international business management (Berdrow and Lane, 2003; Li and Calatone, 1998). Thus, it could be proposed that knowledge acquisition may greatly affect the maritime operators' ability to maximise maritime logistics value. The specific processes of how the knowledge is acquired and how the acquired knowledge positively affects the improvement of maritime logistics value are examined in the following sections.

Figure 7. 4 Result of the Importance of Knowledge for Maritime Logistics Value



7.5.2 Inter-organisational Co-operative Network Embeddedness

This section examines the extent to which maritime operators in Korea cooperate with each other in the form of social networks. Before answering, the definition and explanation of social co-operative networks were initially given to the panellists for

their understanding of such an academic term. The panellists were then required to evaluate the extent to which maritime operators cooperate with other companies in the same business through establishing a network.

While the previous section asked panellists to answer the question without distinguishing the business types of maritime operators, aiming to explore the importance of knowledge for the maritime logistics industry in general, from this section, the panellists were required to answer the questions separately according to the three different business types (i.e. TO: port terminal operator, SL: shipping line, and FF: freight forwarders). This was done in order to elaborately examine the conceptual relationships proposed in Chapter 5 depending upon the business types. The results from the two rounds of the survey are summarised by the values of means and standard deviations, which are shown in Table 7.4 and Figure 7.5.

The mean values of shipping lines are given the highest rating, 3.8, in both of the two rounds, suggesting that they are the most proactive to form co-operative networks. Such a result reflects well on the discussion in Chapter 3 and 6, which describes how Korean shipping lines are generally vigorously co-operating with each other through the formation of strategic alliances, consortiums or other informal methods.

Table 7. 4 Formation of Co-operative Networks

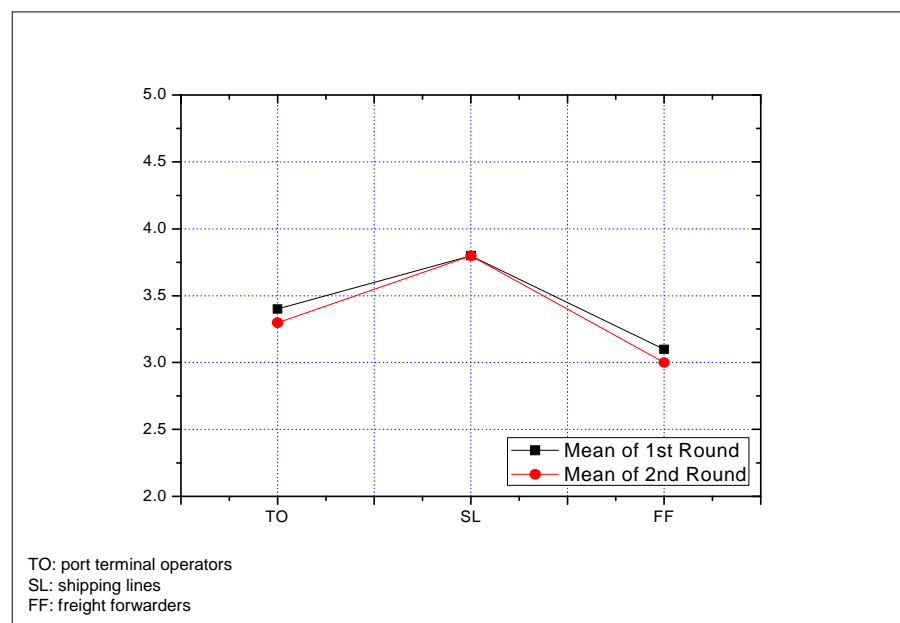
Section II. Co-operative Networks	Q: You should answer whether maritime operators cooperate with other companies in the same business by establishing a network. Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (1= strongly disagree, to 5= strongly agree).	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
Formation of co-operative networks	The firms in the same business cooperate with each other (e.g. in forms of strategic alliance, joint venture, marketing agreement, associations, informal meetings, etc.) through a network	TO	3.4	.78	3.3	.70
		SL	3.8	.83	3.8	.98
		FF	3.1	.93	3.0	.79
	Total		n= 50		n= 32	

The mean values of port terminal operators are 3.4 in the first round, and 3.3 in the second round; and the mean values of freight forwarders are 3.1 in the first round and 3.0 in the second round, showing that the extent of the formation of co-operative networks is at a moderate level. Those results indicate that port terminal operators and

freight forwarders are less proactive to cooperate with each other in the same business than shipping lines.

This specific difference in tendency towards the formation of co-operative networks among maritime operators has been identified in the explorative case study. As discussed in Chapter 6, the port terminal operators in the same port intensively compete with each other, and they hesitate to participate in long-term based formal co-operative contracts such as strategic alliances or joint ventures. But rather, they are more likely to cooperate with other competitors through short-term co-operative forms or others in a more informal way. The business behaviour of freight forwarders is similar in this regard. The freight forwarders tend to cooperate with each other in a more short-term based or indirect manner. Therefore, such tendency of the two businesses may have been seen by the panelists as indicative of the fact that their co-operative networks are at a moderate level.

Figure 7. 5 Formation of Co-operative Network



In relation to the structural and relational network embeddedness of maritime operators, the panellists were asked to evaluate the extent to which a lot of companies join the co-operative network relationships (i.e. network density), and the extent of how close their relationships are (i.e. tie strength in the network). Shipping lines were judged to be

embedded in the dense network, showing the highest mean values (i.e. 3.8 in the first round and 3.9 in the second round). Such a tendency has also been identified in previous literatures and the explorative case study of Chapter 6. They suggest that shipping lines cooperate with a great number of companies in various different ways in the same business.

The extent of the network density of port terminal operators and freight forwarders is lower than that of shipping lines, by showing their mean value ratings of the two rounds within the range 3.0-3.3. Those results indicate that despite the fact that port terminal operators and freight forwarders are embedded in their co-operative networks in the same business, the extent to which they establish a great number of co-operative network relationships lies at a moderate level. As stated in Chapter 3 and 6, the intensive competition of port terminal operators in price and service to attract the greater cargoes may cause them to hesitate in co-operating with many other operators. Freight forwarders in Korea are also slow to form a lot of co-operative network relationships in the business. This may be due to their tough competition in cost and price.

Table 7. 5 The Extent of Co-operative Network Embeddedness

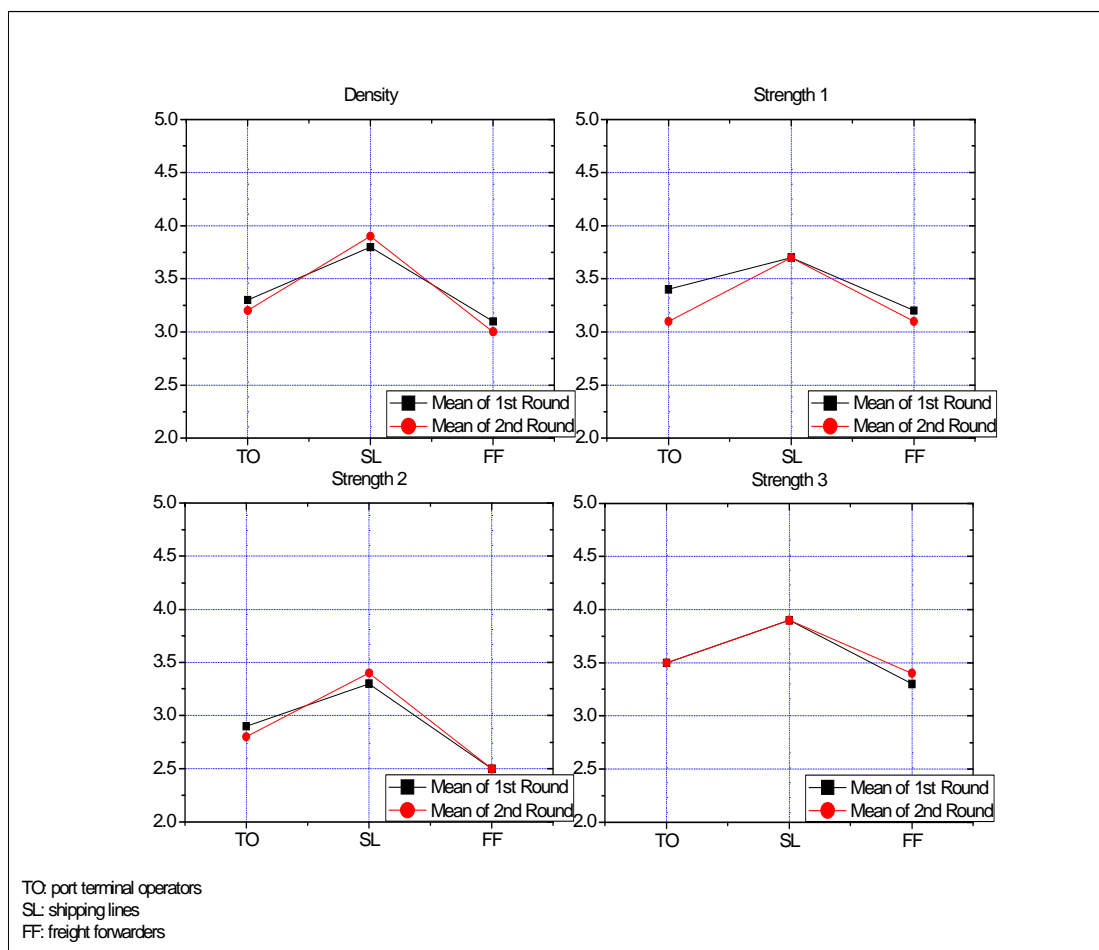
Section II. Co-operative Network	Q: You should answer whether maritime operators cooperate with other companies in the same business by establishing a network. Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (1= strongly disagree, to 5= strongly agree).	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
Network density	Do you think a lot of companies join the co-operative network relationships?	TO	3.3	.81	3.2	.73
		SL	3.8	.87	3.9	.92
		FF	3.1	.84	3.0	.84
Tie Strength in the network	The co-operating firms frequently keep in touch with each other.	TO	3.4	.78	3.1	.76
		SL	3.7	.89	3.7	.86
		FF	3.2	.89	3.1	.80
	The firms invest a lot of money in the co-operative network relationships.	TO	2.9	.89	2.8	.69
		SL	3.3	1.04	3.4	.81
		FF	2.5	.91	2.5	.66
	The firms consider the co-operative partners very important in their business and mutual interests.	TO	3.5	.91	3.5	.96
		SL	3.9	.85	3.9	.85
		FF	3.3	1.10	3.4	.81
	Total		n= 50		n= 32	

With respect to the tie strength of co-operative networks, the following questions were given to the panellists: ‘Do you think the co-operating companies frequently keep in

touch with each other?’ (Strength 1), ‘Do you think the companies invest a lot of money in the co-operative network relationships?’ (Strength 2), and ‘Do you think the companies consider the co-operative partners very important in their business and mutual interests?’ (Strength 3).

As seen in Figure 7.6, the lines presenting the mean values of tie strength are similar to previous results of network formation and density, i.e. inverted V shape. Such a shape means the extent of shipping lines’ tie strength is the highest among the operators. The mean values of shipping lines in the second round are 3.7 in Strength 1, and 3.9 in Strength 3, suggesting that shipping lines are regarded as keeping close ties with their co-operative partners by frequently keeping in touch with each other, and considering the co-operative partners important in their business for mutual interests. However, the mean value of Strength 2 is lower than other components of tie strength, by scoring 3.4 in the second round. This suggests that their financial investment in the co-operative network relationships lies at a moderate level.

Figure 7. 6 Network Embeddedness



All of the mean values of port terminal operators and freight forwarders in Strength 1-3, with the exception of one factor, range from 2.5 to 3.4. The one factor outwith this is Strength 3 of port terminal operators, which scores 3.5 in both the two rounds. Such a result indicates that the extent of tie strength of port terminal operators and freight forwarders in Korea is generally moderate. Notably, while the mean values of Strength 2 are all below 3.0, the mean values of Strength 3 are given the relatively higher rating within a moderate level by scoring the range 3.4-3.5 in the second round. From these results, it would seem to be the case that port terminal operators and freight forwarders, despite hesitating to spend a lot of money on the co-operative network relationships, still regard the co-operative relationships as relatively significant in their business.

The above results may therefore make it clear that shipping lines in Korea establish dense and strong ties within the network despite their moderate level of financial investment on the co-operate relationship. In contrast, the extent of network formation with dense and strong ties appears as a moderate level in both port and freight forwarding operations. Nevertheless, all the operators regard the co-operative partners as relatively significant in their business. Therefore, the results indicate that the extent of co-operative network embeddedness, both structurally and relationally, is the highest in shipping lines, and that of port terminal operators and freight forwarders is at moderate level. These tendencies are consistent with the explorative result presented in Chapter 6.

7.5.3 Co-opetition in the Network

Prior to an exploration of co-opetition in the network, the extent of competition of the maritime operators was initially examined. The competition was measured by the following five aspects: operational resources, employee quality, financial capability, customers, and service quality. The first three factors are related to internal resource competition, and the latter two factors relate to external market competition. The panellists were asked to indicate the extent to which the five factors of competition of maritime operators are similar to each other within the co-operative networks. If the mean value of each question is high, it is regarded as indicating that the competition is respectively high. Table 7.6 shows the result of this section.

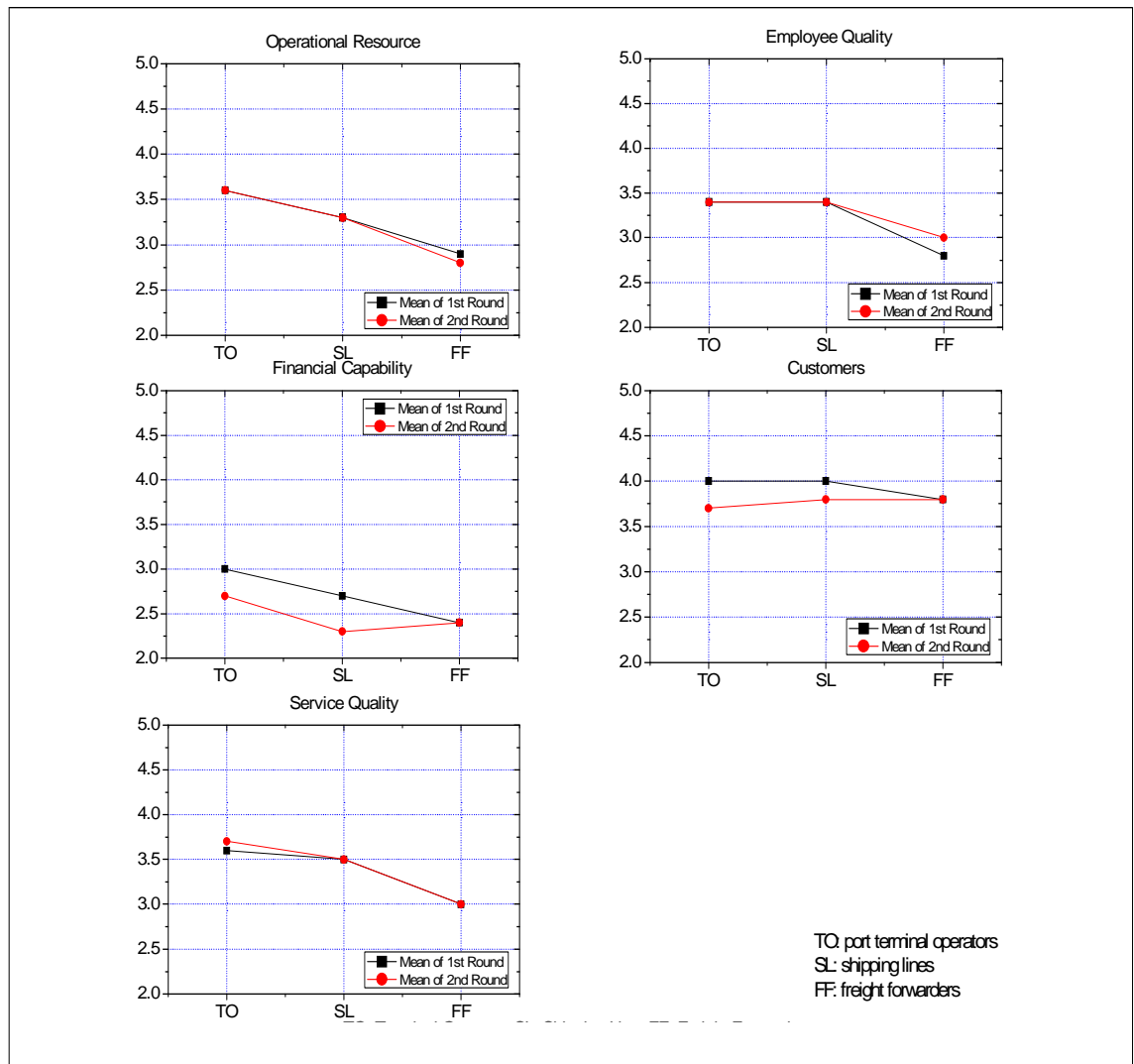
The vast majority of mean values of internal resource competition, but one factor, lay within the range of 2.3 to 3.4, suggesting that the extent of internal resource competition of maritime operators is generally at a moderate level. The one factor outwith this is the operational resource of port terminal operators, which scores 3.6 in both rounds. Such a result reveals that despite the general tendency of a moderate level in the extent of internal resource competition of maritime operators, the operational resource competition in port terminal operations is exceptionally intensive.

Such a result indicates that despite the general tendency of a moderate level in the extent of internal resource competition of maritime operators, the operational resource competition in port terminal operations is exceptionally intensive. This tendency ensures that port terminal operators in Korea may struggle to keep pace with competitors' operational resources. On the other hand, it has been identified that the internal resources of shipping lines and freight forwarders are not very similar to each other. This may due to the facet that the numbers of the players in the same business in shipping and freight forwarding are much higher than the numbers of port terminal operation, and this may lead to higher variability of internal resources between the competitors in the shipping and freight forwarding industry. As a result, the competition level in internal resources appears the highest in port terminal operation.

Table 7. 6 Table the Result of Competition in the Network

Section III. Competition in the Network	Q: Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree).	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
Operational resources	Operational resources (e.g. facilities, equipment, information system) in the network are similar to each other	TO	3.6	.88	3.6	.84
		SL	3.3	.97	3.3	.86
		FF	2.9	.99	2.8	.72
Quality of employees	The quality of employees (e.g. the levels of education, skill, knowledge and other ability to perform their job) is similar to each other	TO	3.4	.88	3.4	.83
		SL	3.4	1.07	3.4	.83
		FF	2.8	.98	3.0	.89
Financial capability	The financial capability (e.g. funding ability or health of financial structure) in the network is similar to each other	TO	3.0	1.07	2.7	.78
		SL	2.7	1.08	2.3	.79
		FF	2.4	.89	2.4	.83
Customers	The customers in the network are similar to each other	TO	4.0	.68	3.7	.86
		SL	4.0	.73	3.8	.98
		FF	3.8	.81	3.8	.88
Service quality	The service qualities in the network are similar to each other	TO	3.6	.86	3.7	.79
		SL	3.5	.97	3.5	.88
		FF	3.0	.95	3.0	.84
	Total		n= 50		n= 32	

Figure 7. 7 Competitions in the Network



With respect to external market competition, i.e. the similarity of customers and service quality, all but one factor were given mean rating within the range 3.5 to 4.0, suggesting that the external market competition of maritime operators is generally tough. The one component outwith these figures is the service quality of freight forwarders. The mean value of the factor is 3.0 in both rounds. Such a result may be due the fact that, as identified in Chapter 3, as there are over 1,300 numbers of freight forwarders operating in Korea, the extent of the variability of their services may be very high, and thus, the extent of similarity of their services may not be notable. However, as with shipping lines and port terminal operators, freight forwarders' competition towards the customers is judged as tough since the mean value is 3.8 in both of the two rounds. The results indicate that they intensive competition with each other in order to attract the greater number of customers at the external market.

Table 7. 7 The Extent of Competition of Maritime Operators

Competition		Port terminal operators	Shipping lines	Freight forwarders
Internal resource competition	Operational resources	H	M	M
	Quality of employees	M	M	M
	Financial capability	M	M	M
External market competition	Customers	H	H	H
	Service quality	H	H	M

Notes: H= high, and M= moderate

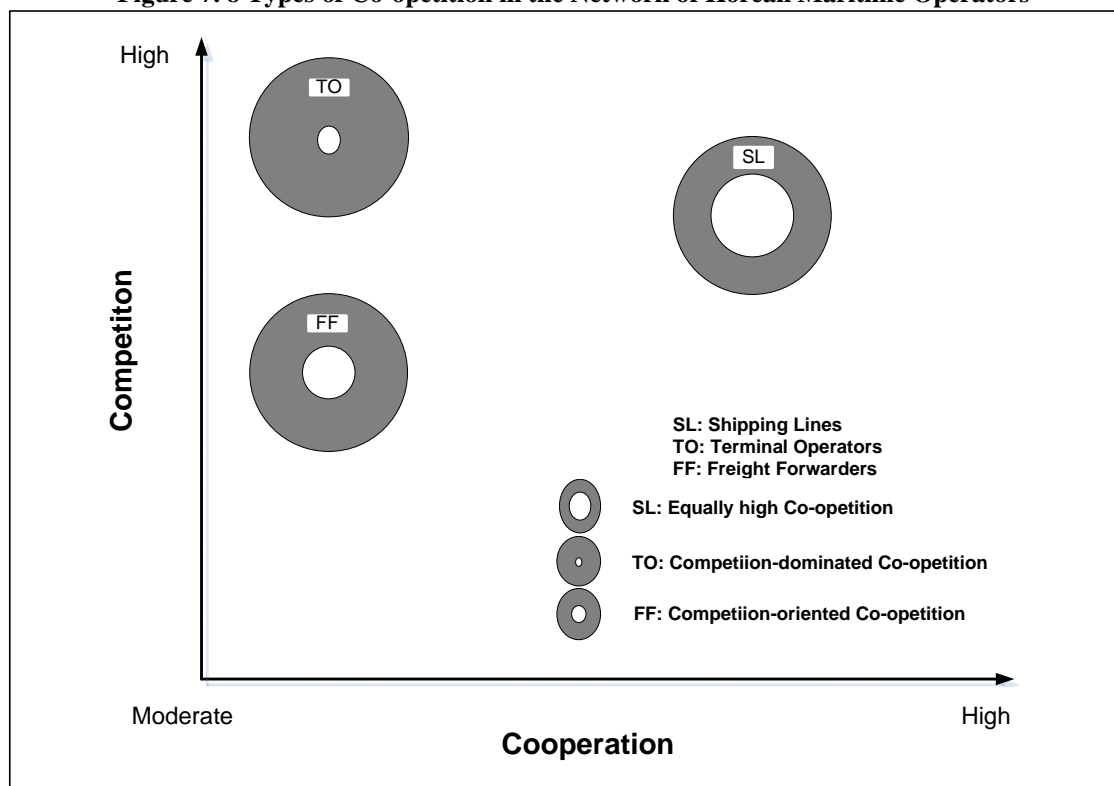
Table 7.7 summarises the extent of maritime operators' competition according to the internal and external factors. Port terminal operators' intensive competition occurs within both an internal and external level. This tendency towards high levels of competition in port terminal operation has been addressed a great deal, both in previous literatures and in the explorative case study in the previous chapter. Shipping lines, despite the moderate level in internal resource competition, intensively compete with each other at the external market. The competition of freight forwarders is also tough, purely on the basis of attracting customers. Therefore, the extent of the competition appears to be the highest in port terminal operations; despite the lower level than that of port terminal operators, the extent of competition of shipping lines is also regarded as generally intensive as the two components of external competition all fall at a high level; and the competition of freight forwarders seems to be generally moderate level, but the competition to attract customers is tough.

By integrating the above extent of competition and co-operation which were observed in the previous section, the level of co-opetition of each business can be identified (Bengtsson and Kock, 2000). Co-opetition is referred to as an interdependent relationship in which competition and co-operation simultaneously occur between two or more competitors (Luo, 2004; Tsai, 2002). As the extent of both competition and co-operation of the maritime operators are all at or above the moderate level, it can be assumed that the competition and co-operation in each maritime business occurs simultaneously. Thus, co-opetition in the network is observed in all the maritime businesses.

However, levels of co-opetition of the maritime operators vary depending on the extent of competition and co-operation of each business (Bengtsson and Kock, 2000). As

discussed in Chapter 4, Bengtsson and Kock (2000) classify co-opetition into three types according to the extent of competition and co-operation: co-operation-dominated, competition-dominated and equal relations. The cooperation-dominated relationship is one where there is more cooperation than competition; the equal relationship is one where cooperation and competition are the same; and the competitive dominant relationship is where there is more competition than cooperation. Drawing upon Bengtsson and Kock's (2000) classification, this thesis classifies the co-opetition of each business in terms of the extent of competition and co-operation.

Figure 7. 8 Types of Co-opetition in the Network of Korean Maritime Operators



Source: Modified from Bengtsson and Kock (2000)

As seen in Figure 7.8, port terminal operators (TO) whose competition is the most extreme, and whose co-operation is at moderate level, fall into the 'competition-dominated co-opetition'; shipping lines (SL) whose competition and co-operation are both high would be 'equally high co-opetition'; and freight forwarders (FF) whose competition is modestly high (i.e. high but lower than port terminal operators and shipping lines) and whose co-operation is moderate is referred to as a type of 'competition-oriented co-opetition'. Thus, while the co-opetition of port terminal operators and freight forwarders tends to a relationship consisting of more competition

than co-operation, the co-opetition of shipping lines is more likely to be a well balanced relationship, where competition and co-operation are simultaneously high. This different type of co-opetition in each business may have a different influence on knowledge acquisition of maritime operators, and such an influence will be analysed in the next section. This will then be followed by the effect of the co-operative network on the knowledge acquisition of maritime operators.

7.5.4 Co-operative Networks and Knowledge Acquisition

This section investigates whether co-operative network embeddedness helps maritime operators to acquire knowledge. The panellists were asked to indicate the extent to which they agree or disagree with the following statements: ‘The higher numbers of co-operative network relationships they have, the more useful information and know-how they acquire’ (i.e. network density and knowledge acquisition), and ‘The stronger co-operative network relationships they have, the more useful information and know-how they acquire’ (i.e. strong tie and knowledge acquisition). Tabel 7.8 summarises the result of the questions.

Table 7.8 Co-operative Networks and Knowledge Acquisition

Section IV. Co-operative Network, Co-opetition and Knowledge Acquisition	Q: You should answer whether the co-operative network has a positive influence on acquiring knowledge. Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree).	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
The higher numbers of co-operative network relationships they have, the more useful information and know-how they acquire.		TO	3.8	.80	3.8	.71
		SL	3.9	.83	4.0	.62
		FF	3.9	.86	3.9	.66
The stronger co-operative network relationships they have, the more useful information and know-how they acquire.		TO	3.9	.73	3.8	.75
		SL	4.1	.67	4.0	.66
		FF	4.1	.86	3.7	.86
Total			n= 50		n= 32	

The extent of the positive effectiveness of network density on the knowledge acquisition is the highest in shipping lines, where the mean values rested at 3.9 in the first round and 4.0 in the second round. As observed in the previous section, the network density of shipping lines was the highest of all. Thus, the result reveals that the shipping lines which have a great number of co-operative partners can gain a lot of knowledge-based

benefits from the network. The mean values of freight forwarders are 3.9, and port terminal operators are 3.8 in both rounds. That result is interesting, because the extent of network density of the two operators was all observed as resting at a moderate level. It can be assumed from this result that regardless of how high the network density is in which an operator is embedded, the maritime operators who have relatively greater numbers of co-operative partners can acquire more knowledge than others who do not.

As discussed in Chapter 4, the greater the numbers of co-operative ties firms have, they can share more knowledge about the industry, market, or the firms' own technology. Thus, high numbers of network ties are likely to lead to a player having a higher volume and speed of knowledge acquisition (Galaskiewicz, 1979). Thus, the above result supports the conclusions of the existing literature on the informational benefit from dense network embeddedness.

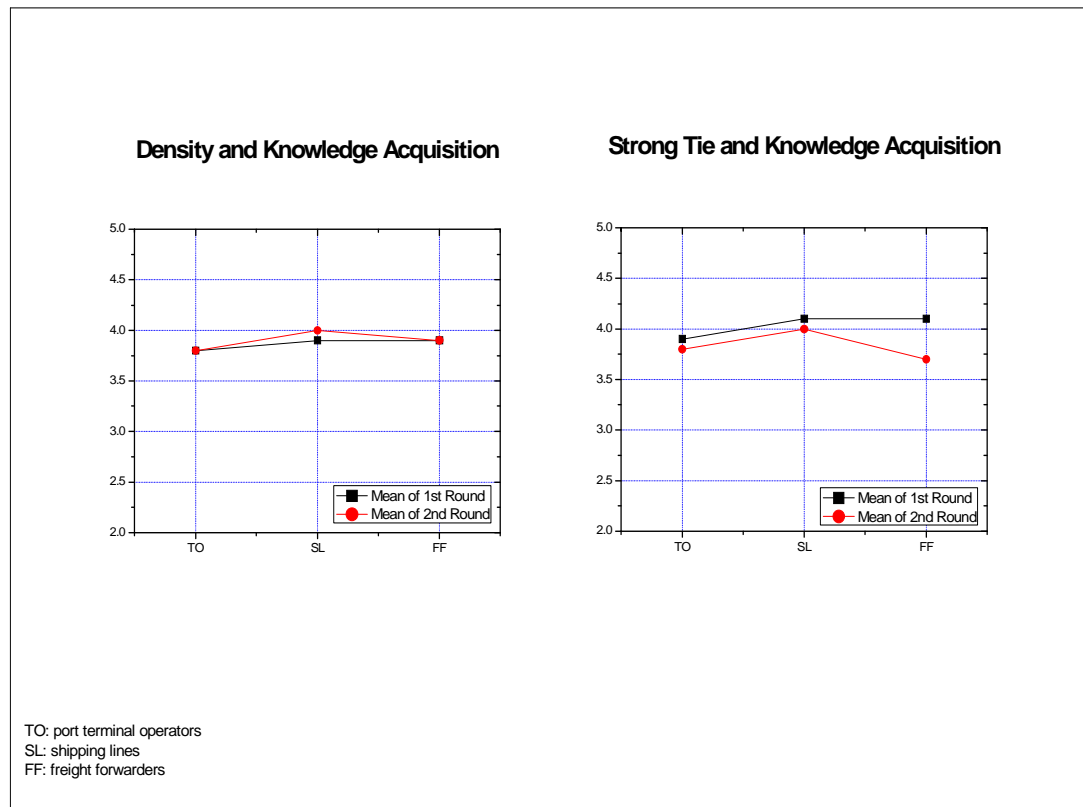
With respect to the relationship between strong ties and knowledge acquisition, all are given the mean value ratings above 3.5, which suggest that the operators are acquiring knowledge through keeping close relationships with their co-operative partners. In particular, like the previous result, shipping lines who score the highest mean rating gain the most knowledge; and port terminal operators and freight forwarders are also acquiring knowledge through strong ties with their partners, despite the fact that they engage in lower levels of closeness than do shipping lines.

Previous literatures ensure that the strength of ties may also affect the knowledge acquisition of a player in a network. The strong relationships with other players in a co-operative network can promote facilitate the vigorous knowledge exchange between organisations (Krackhardt, 1992; Uzzi, 1997; Kraatz, 1998). Thus, the result about the relationship between strong ties and knowledge acquisition may support the existing findings.

Throughout the above results, the importance of co-operative networks with high density and strong ties in acquiring knowledge is stressed. Shipping lines appear to be the main beneficiary in acquiring knowledge, thanks to their passionate co-operation. Moreover, despite the fact that port terminal operators and freight forwarders are not very active in co-operating with each other, the operator which establishes a lot of co-

operative partnerships and keeps close with their partners can gain a great number of knowledge-based benefits from the networks.

Figure 7.9 Co-operative Networks and Knowledge Acquisition



7.5.5 Co-opetition in the Network and Knowledge Acquisition

The effectiveness of co-opetition in the co-operative network on the knowledge acquisition was then examined by asking panellists the following question: ‘Do you think that the acquisition of useful information and know-how through the co-operative network is facilitated more when the competition is high?’ The higher rating of that question means the higher positive influence of co-opetition on knowledge acquisition (Tsai, 2002). The result are summarised in Table 7.9 and Figure 7.10.

Shipping lines lay the highest mean value of 3.8 in the second round, which reveals the positive effect of co-opetition on knowledge acquisition. The mean values of port

terminal operators and freight forwarders are, respectively, 3.3 and 3.4 in the second round, suggesting that the extent of knowledge acquisition through co-opetition in the network is at a moderate level.

Table 7. 9 Co-opetition in the Network and Knowledge Acquisition

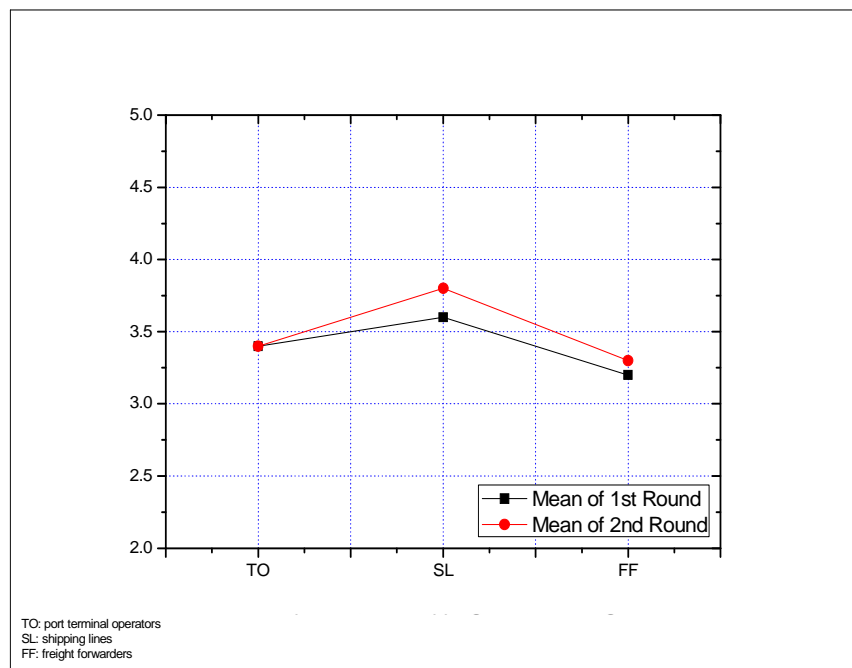
Section IV. Co- operative Network, Co-opetition and Knowledge Acquisition	Q: You should answer whether the co-operative network has a positive influence on acquiring knowledge. Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree)	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
Co-opetition and Knowledge Acquisition	The acquisition of useful information and know-how through the co-operative network is facilitated more when the competition is high.	TO	3.4	.98	3.4	.67
		SL	3.6	.99	3.8	.57
		FF	3.2	1.08	3.3	.70
	Total		n= 50		n= 32	

The above result indicates that despite the fact that all of the maritime operators establish co-opetitive relationships in the network, the positive influence of the co-opetition in acquiring knowledge occurred only in shipping operations. As discussed in the previous section, shipping lines' co-opetition is an equally high relationship, port terminal operators is competition-dominated co-opetition, and the co-opetition of freight forwarders is a competition-oriented relationship. The difference in co-opetition of shipping lines from other two operators lies in the extent of co-operation, since only shipping lines have the higher level of co-operation (i.e. high density and strong ties) in the network, but the others have a moderate level of co-operation. Such a result indicates that the positive effectiveness of co-opetition may be different depending upon the extent of co-operation of the network where firms are embedded. Notably, only within the highly co-operative networks, competition plays the role of a catalyst in acquiring knowledge; but the positive influence of competition in the network is not effective when the extent of co-operation among actors is not great like port and freight forwarder operations.

The reason for the occurrence of the above tendency can be illustrated by the pattern of inter-organisational behaviours. Partnerships of highly dense and strong ties within co-

operative networks are usually controlled by the following inter-organisational governance mechanisms: relational trust, norms of mutual gain, reciprocity, and long-term perspective (Coleman, 1988; Rowley et al., 2000). Network governance mechanism is referred to as “a social mechanism – rather than authority, bureaucratic rules, standardization, or legal resource – that facilitates monitoring, coordinating, and safeguarding inter-organisational exchanges of resources or information” (Jones et al., 1997). Those mechanisms may force the actors in a network to share knowledge with other partners or sometimes with direct competitors, so that they may maximise common interests.

Figure 7. 10 Co-opetition and Knowledge Acquisition



Firms are generally more eager to achieve their competitors’ knowledge, since the perceived competitive tension may stimulate the willingness to acquire the resource of the competitors. But at the same time, firms also wish to protect their resource from their competitors. However, firms under the above governance mechanisms of highly co-operative networks, may no longer perfectly protect their knowledge. Instead, due to the reciprocity, mutuality and trust from a long-term perspective, they should open their knowledge as much as their desire to get competitors’ knowledge. Otherwise, the firm who hesitate to open their knowledge but simultaneously look to gain other firms’

knowledge may easily garner bad reputations or lose the trust of other actors in the network, which in turn may negatively affect their business. Consequently, the competition promotes mutual knowledge sharing with the highly co-operative partners under the social control mechanisms.

In contrast, the actors under the networks where the level of co-operation is not high, like the port terminal operators and freight forwarders in this study, are less likely to be controlled by the above governance mechanisms. Thus, the competition may not positively affect the vigorous knowledge sharing with the partners in less co-operative networks. That may be the reason why the co-opetition in the networks of port terminal operators and freight forwarders do not have a positive influence on knowledge acquisition.

Consequently, the above findings support the previous contention which stresses that well balanced co-opetition with high competition and high co-operation promotes mutual knowledge sharing between organisations (Lado, Boyd and Nalón, 1997; Tsai, 2002). In this sense, a positive interaction effect between co-operation and competition in acquiring knowledge can be observed from the result of this question.

7.5.6 Knowledge Acquisition and Maritime Logistics Value

In this section, the positive effectiveness of the acquired knowledge on maritime logistics value is analysed. The maritime logistics value is measured by the following seven indicators: business cost, lead time, on time, responsiveness, flexibility, and reliability. As summarised in Table 7.10, the panellists are asked to indicate the extent to which they agree or disagree by being given the statements presenting the positive relation between knowledge acquisition and maritime logistics value.

All of the mean values of the two rounds except two factors are above 3.5 and close to 4.0. This result suggests that the acquired knowledge generally helps maritime operators to reduce business cost and lead time, provide service on time and improve service responsiveness, flexibility and reliability.

Table 7. 10 Knowledge Acquisition and Maritime Logistics Value

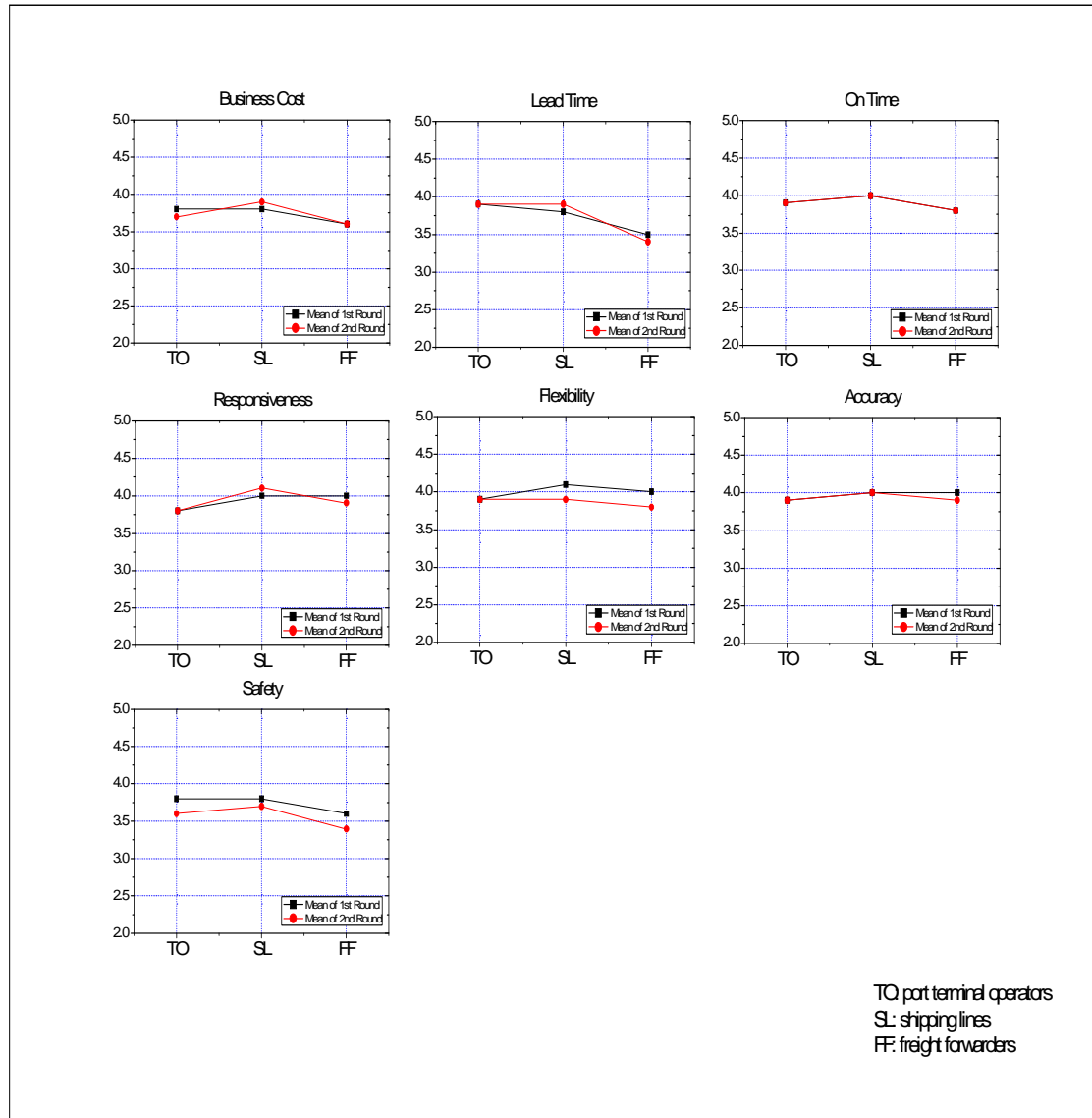
Section V. Knowledge Acquisition and Maritime Logistics Value	Q: Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree)	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
Business cost	Knowledge acquisition has a positive effect on reducing business costs.	TO	3.8	.68	3.7	.60
		SL	3.8	.79	3.9	.75
		FF	3.6	.93	3.6	.84
Lead time	Knowledge acquisition has a positive effect on reducing lead time.	TO	3.9	.71	3.9	.49
		SL	3.8	.66	3.9	.71
		FF	3.5	.79	3.4	.98
On time	Knowledge acquisition has a positive effect on providing services on time.	TO	3.9	.72	3.9	.62
		SL	4.0	.68	4.0	.69
		FF	3.8	.85	3.8	.80
Responsiveness	Knowledge acquisition has a positive effect on providing customised services to their customers.	TO	3.8	.77	3.8	.71
		SL	4.0	.73	4.1	.77
		FF	4.0	.79	3.9	.76
Flexibility	Knowledge acquisition has a positive effect on flexibly responding to unexpected circumstances or volatile customer needs.	TO	3.9	.74	3.9	.85
		SL	4.1	.71	3.9	.83
		FF	4.0	.75	3.8	.72
Reliability	Accuracy- knowledge acquisition has a positive effect on providing accurate information to their customers.	TO	3.9	.76	3.9	.63
		SL	4.0	.73	4.0	.75
		FF	4.0	.74	3.9	.79
	Safety- Knowledge acquisition has a positive effect on providing safe services (i.e. minimising loss or damage of cargoes).	TO	3.8	.79	3.6	.73
		SL	3.8	.74	3.7	.75
		FF	3.6	.84	3.4	.51
	Total		n= 50		n= 32	

Previous studies have noted that knowledge acquisition may help to improve firms' competitive advantage such as improving organisational efficiency and effectiveness and developing organisational innovative capability (Cohen and Levinthal, 1990; Huber, 1991; Yli-Renko, Autio and Sapienza, 2001; Schulz, 2001). Yli-Renko et al. (2001) highlight the positive influence of knowledge acquisition on firms' competency and business costs. Panayides (2007) postulates that organisational learning affects the improvement of service quality of a logistics firm. Germain and Birou (2005) highlight that knowledge in supply chain positively affects market performance. Thus, the positive relationship between knowledge acquisition and maritime logistics value shown in this section may strongly support the previous findings.

On the other hand, the two factors which show moderate levels are lead time and safety factors in freight forwarding operation. Those results may due to the industrial characteristic of freight forwarders. As the main function of freight forwarders is to arrange or intermediate ocean carriage as an agency of shippers, they are less likely to directly participate in moving cargoes with vessels or in handling cargoes at ports. Thus, the extent to which they can control the reduction of lead time and minimize loss or

damage of cargoes may be lower than that of shipping lines and port terminal operators. This may lead to the perception of a relatively lower level of the positive effectiveness of knowledge acquisition on maritime logistics value.

Figure 7. 11 Knowledge Acquisition and Maritime Logistics Value



As seen in Figure 7.11, the lines, which show the results of the mean values in the second round, form an inverted-V shape. Such a pattern indicates that the effectiveness of the acquired knowledge on maritime logistics value appears to be the strongest in shipping lines. The effectiveness of port terminal operators' knowledge acquisition is then next to that of the shipping lines. Freight forwarders seem to be relatively low

compared to the two other operators, but the result is still generally high, with its mean values being above 3.5.

The above findings in this section empirically reflect the positive relationships between the co-operative and co-opetitive network embeddedness, knowledge acquisition and maritime logistics value, which were proposed in the conceptual model. It indicates that social co-operative/co-opetitive networks facilitate the acquisition of more knowledge, and the acquired knowledge consequently has a positive effect on enhancing maritime logistics value.

For instance, shipping lines were observed to acquire more knowledge than other types of maritime operators through their high levels of co-operation and co-opetition. The excellence of shipping lines in acquiring knowledge has consequently resulted in the highest level in improving maritime logistics value among maritime operators. With respect to port terminal operators and freight forwarders, which are less prone to co-operating with each other, the positive influence of inter-organisational co-operation and co-opetition on knowledge acquisition was weaker than that of shipping lines. As a result, the positive effectiveness of the acquired knowledge on maritime logistics value was slightly lower than that of shipping lines.

From the above results, it is possible to draw out a new finding concerning the consecutive positive effectiveness between network embeddedness, knowledge acquisition and maritime logistics value. The causal, two-stage element of this positive relationship has not yet been investigated in the previous studies. Thus, the findings may clear the way for further meaningful empirical analysis.

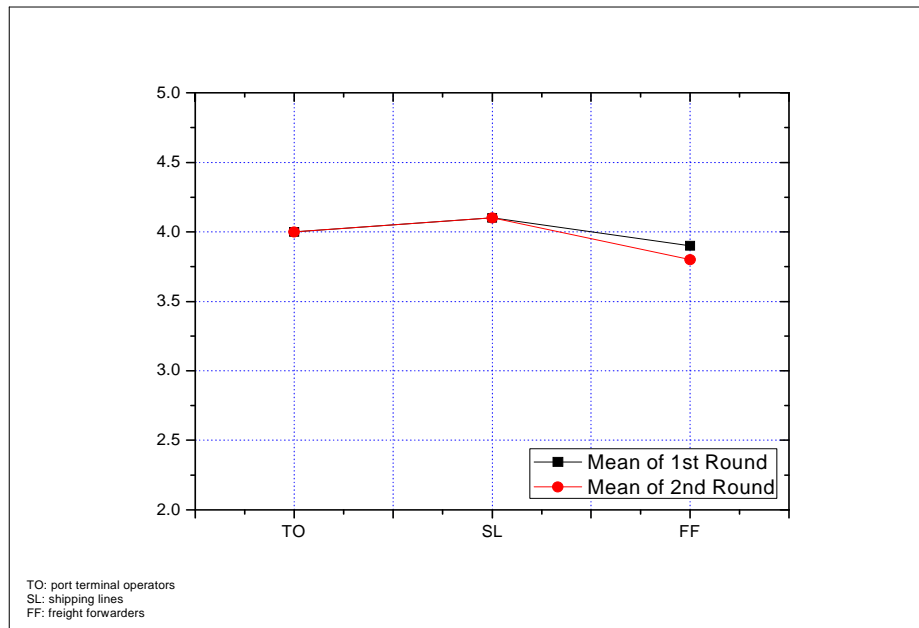
7.5.7 Strategic Importance of Knowledge Management in Maritime Logistics

The final section of the survey evaluates whether knowledge management is an essential strategic alternative in maritime logistics industry. The panellists were asked to indicate the extent to which they agreed or disagreed with the following statements: ‘the knowledge management system (i.e. knowledge acquisition and application) may be an important strategy in improving maritime logistics value’. The results are summarised in Table 7.11 and Figure 7.12.

Table 7. 11 Strategic Importance of Knowledge Management in Maritime Logistics

Section VII Strategic Importance of Knowledge Management in Maritime Logistics	Q: Please indicate the extent to which you agree or disagree with the following statements regarding your opinion (from 1= strongly disagree, to 5= strongly agree).	Business Type	1 st Round		2 nd Round	
			Mean	SD	Mean	SD
	The knowledge management system (i.e. knowledge acquisition and application) may be an important strategy in improving maritime logistics value)	TO	4.0	.75	4.0	.73
		SL	4.1	.79	4.1	.76
		FF	3.9	.88	3.8	.77
	Total		n= 50		n= 32	

Figure 7. 12 Strategic Importance of Knowledge Management



All are given a mean rating within the range of 3.8 to 4.1. It suggests that the panellists believe that the knowledge management system, i.e. knowledge acquisition and application, is a significant strategic option for maritime operators in improving maritime logistics value. As analysed in the previous sections in this chapter, most of the respondents have acknowledged that knowledge acquisition may help maritime operators to reduce lead time and business costs and to improve service responsiveness, flexibility and reliability. Through the presence of such answers, the panellists are confirming the role of knowledge-based strategy in maritime logistics business.

In this section, the strategic importance of knowledge management system is validated by the experts in Korean maritime logistics industry. This result is also consistent with the previous evidence which stresses that knowledge acquisition may be a desirable strategy which enables firms to maximise competitive advantage and achieve

organisational goals (Cohen and Levinthal, 1990; Huber, 1991; Yli-Renko, Autio and Sapienza, 2001; Schulz, 2001).

Table 7.12 summarises the entire results of two rounds of the survey. To sum up the result of the Delphi survey, a panel of experts in the Korean maritime transport industry discussed the issue of knowledge acquisition and maritime logistics value in the Korean maritime logistics industry. According to this discussion, Korean maritime operators acquire knowledge through the co-operative networks in which they are densely and closely embedded. The 'equally high' co-opetition in the network of Korean maritime operators has a positive effect on their knowledge acquisition through the co-operative network embeddedness.

The above results are consistent with existing contentions which highlight that co-operative/co-opetitive strategy facilitates inter-organisational learning and knowledge exchange between firms (Lado et al., 1997; Tsai, 2002). To be more specific, the higher numbers of and strength in ties in a network would be the central relational resource in facilitating the knowledge acquisition of Korean maritime operators. Given the positive relationship between co-operation in a network and knowledge acquisition, inter-organisational competition in the network promotes more vigorous knowledge sharing between the proactively cooperating parties. It is therefore to note that destructive competition among players in a co-operative network may harm the common informational benefits of the players. Thus, strategic decision makers should indicate that keeping a balance between cooperation and competition would be a critical element in effectively administrating the inter-organisational co-ordination with other firms in order to gain greater knowledge-based advantages.

In relation to the effectiveness of knowledge acquisition in the maritime logistics industry, the results of the survey ensure that the acquired knowledge facilitates the further reduction in lead time and costs, and increases the ability of Korean maritime operators to offer flexible, responsive and reliable services. This result therefore highlights the importance of knowledge acquisition strategy in maritime logistics management. It also indicates that a knowledge-based strategy is essential in order to survive in the tough competitive marketplace, since this strategy may allow maritime logistics operators to flexibly and swiftly respond to a dynamic business environment, as well as maximise organisational efficiency and effectiveness. Thus, maritime

logistics companies should make all the necessary efforts to gain knowledge, and then to make use of the gained knowledge in a more systematic and enthusiastic way. Further, as knowledge management literatures have highlighted, it could be also expected that the successful knowledge management system may facilitate the creation of organisational innovation and the sustainable competitive advantage of maritime logistics operators. In this sense, the knowledge management strategy could be a central strategic direction for maritime logistics operators -- not only to gain the greater profit of individual companies but also to add value to global logistics flows.

7.6 SUMMARY

In this chapter, the design, process and empirical findings of two rounds of the Delphi survey were discussed. A questionnaire for the survey was formulated through construct operationalisation and measurement process. A panel was initially selected under strict guidelines, to ensure that members were experts in the Korean maritime logistics industry. Empirical results were indicated by the mean values and standard deviation of each question. The empirical findings generally support the proposed model of the positive relationship between co-operative and co-opetitive networks, knowledge acquisition and maritime logistics value. The next chapter suggests propositions and discusses the strategic implications based on the empirical findings of this study.

Table 7. 12 Results of Two Rounds of the Delphi Survey

Section		Questions	Business Type	1 st Round		2 nd Round		
				Mean	SD	Mean	SD	
I. Knowledge for maritime logistics value	Market-specific knowledge	General information (e.g. new trends in the maritime transport industry, business culture or practice of the market, and governmental regulations of the industry)		4.2	.62	4.0	.90	
		Customer demands on maritime operators' service		4.5	.65	4.5	.67	
		Competitors' strategy and behaviours		4.2	.71	4.2	.87	
	Firm-specific knowledge	Operational skills or information technology (e.g. managerial information system, process reengineering system, and just-in-time or lean system)		4.1	.68	4.0	.73	
		Overall skills of managing related know-how (e.g. employee education, or training)		3.9	.76	3.6	.75	
		Marketing related know-how (e.g. promotion, price, distribution, and customer relationships management)		4.0	.65	3.8	.76	
II. Co-operative Network	Formation of Network	The firms in the same business cooperate with each other (e.g. in forms of strategic alliance, joint venture, marketing agreement, associations, and informal meetings) through a network	TO	3.4	.78	3.3	.70	
			SL	3.8	.83	3.8	.98	
			FF	3.1	.93	3.0	.79	
	Network density	Do you think a lot of companies join the co-operative network relationships?	TO	3.3	.81	3.2	.73	
			SL	3.8	.87	3.9	.92	
			FF	3.1	.84	3.0	.84	
	Tie Strength in the network	The co-operating firms frequently keep in touch with each other.	TO	3.4	.78	3.1	.76	
			SL	3.7	.89	3.7	.86	
			FF	3.2	.89	3.1	.80	
		The firms invest a lot of money in the co-operative network relationships.	TO	2.9	.89	2.8	.69	
			SL	3.3	1.04	3.4	.81	
			FF	2.5	.91	2.5	.66	
		The firms consider the co-operative partners very important in their business and mutual interests.	TO	3.5	.91	3.5	.96	
			SL	3.9	.85	3.9	.85	
			FF	3.3	1.10	3.4	.81	
III. Competition in the network	Operational resources	Operational resources (e.g. facilities, equipment, and information system) in the network are similar to each other'	TO	3.6	.88	3.6	.84	
			SL	3.3	.97	3.3	.86	
			FF	2.9	.99	2.8	.72	
	Quality of employees	The quality of employees (e.g. the levels of education, skill, and knowledge and other ability to perform their job) is similar to each other.	TO	3.4	.88	3.4	.83	
			SL	3.4	1.07	3.4	.83	
			FF	2.8	.98	3.0	.89	
	Financial capability	The financial capability (e.g. funding ability or health of financial structure) in the network is similar to each other	TO	3.0	1.07	2.7	.78	
			SL	2.7	1.08	2.3	.79	
			FF	2.4	.89	2.4	.83	
	Customers	The customers in the network are similar to each other	TO	4.0	.68	3.7	.86	
			SL	4.0	.73	3.8	.98	
			FF	3.8	.81	3.8	.88	
	Service quality	The service qualities in the network are similar to each other	TO	3.6	.86	3.7	.79	
			SL	3.5	.97	3.5	.88	
			FF	3.0	.95	3.0	.84	
IV. Network embeddedness and knowledge acquiaition	Co-operative Network and Knowledge Acquisition	The firms acquire useful information and know-how through the co-operative network.	TO	3.4	.73	3.1	.62	
			SL	3.6	.85	3.7	.64	
			FF	3.1	.83	3.0	.78	
		The higher numbers of co-operative network relationships they have, the more useful information and know-how they acquire.	TO	3.8	.80	3.8	.71	
			SL	3.9	.83	4.0	.62	
			FF	3.9	.86	3.9	.66	
			The stronger co-operative network relationships they have, the more useful information and know-how they acquire.	TO	3.9	.73	3.8	.75
				SL	4.1	.67	4.0	.66
				FF	4.1	.86	3.7	.86
Co-opetition and Knowledge Acquisition	The acquisition of useful information and know-how through the co-operative network is facilitated more when the competition is high.	TO	3.4	.98	3.4	.67		
		SL	3.6	.99	3.8	.57		
		FF	3.2	1.08	3.3	.70		
V. Knowledge acquisition and maritime logistics value	Business cost	Knowledge acquisition has a positive effect on reducing business costs.	TO	3.8	.68	3.7	.60	
			SL	3.8	.79	3.9	.75	
			FF	3.6	.93	3.6	.84	
	Lead time	Knowledge acquisition has a positive effect on reducing lead time.	TO	3.9	.71	3.9	.49	
			SL	3.8	.66	3.9	.71	
			FF	3.5	.79	3.4	.98	
	On time	Knowledge acquisition has a positive effect on providing their service on time.	TO	3.9	.72	3.9	.62	
			SL	4.0	.68	4.0	.69	
			FF	3.8	.85	3.8	.80	
	Responsiveness	Knowledge acquisition has a positive effect on providing customised services to their customers.	TO	3.8	.77	3.8	.71	
			SL	4.0	.73	4.1	.77	
			FF	4.0	.79	3.9	.76	
	Flexibility	Knowledge acquisition has a positive effect on flexibly responding to unexpected circumstances or volatile customer needs.	TO	3.9	.74	3.9	.85	
			SL	4.1	.71	3.9	.83	
			FF	4.0	.75	3.8	.72	
	Reliability	Knowledge acquisition has a positive effect on providing accurate information to their customers.	TO	3.9	.76	3.9	.63	
			SL	4.0	.73	4.0	.75	
			FF	4.0	.74	3.9	.79	
	Knowledge acquisition has a positive effect on providing safe services (i.e. minimising loss or damage of cargoes).	TO	3.8	.79	3.6	.73		
		SL	3.8	.74	3.7	.75		
		FF	3.6	.84	3.4	.51		
VI. Strategic importance of knowledge management in maritime logistics	The knowledge management system (i.e. knowledge acquisition and application) may be an important strategy in improving maritime logistics value)	TO	4.0	.75	4.0	.73		
		SL	4.1	.79	4.1	.76		
		FF	3.9	.88	3.8	.77		
	Total			n= 50		n= 32		

CHAPTER 8 IMPLICATIONS AND CONCLUSIONS

8.1 INTRODUCTION

This chapter summarises the thesis, and discusses the empirical findings presented in Chapters 6 and 7 in comparison with the theoretical examination of the conceptual model. Propositions drawn from the findings are then suggested. This work may allow us to identify both the presence of this study in the theoretical stream of maritime studies, and its academic significance. This chapter then refines the results of the empirical examination, according to the three respective business sectors of maritime operators. This leads to the suggestion of strategic implications for each business, and provides managers with meaningful insights into the successful application of knowledge-based strategy to their operations. Finally, the chapter concludes by discussing contributions and limitations of the thesis and directions for future research.

8.2 SUMMARY OF THE THESIS

The aim of this thesis is to apply a knowledge management strategy to maritime operations and to diagnose the applicability and effectiveness of the knowledge-based strategy for maritime operators. The following two phases constitute this research: developing a conceptual model based on a literature review, and verifying it empirically from a qualitative approach.

8.2.1 Developing the Conceptual Model

Two research questions were initially addressed in this phase: (i) how could maritime operators acquire the knowledge for maritime logistics value?; and (ii) how could the acquired knowledge improve maritime logistics value?, and is knowledge management strategy a desirable strategic alternative for maritime operators to improve maritime logistics value?

In order to answer the aforementioned research questions, this research reviewed relevant maritime business literatures and key strategic management theories in order to link the best theories and strategic practices to the maritime logistics business. The key factors considered most significant when choosing the theory or practices which guide the way to maximise maritime logistics value, were whether those theories or practices may help to improve operational efficiency and service effectiveness in maritime operations. Throughout the literature review, it has been identified that knowledge-based strategy would be one of the most influential strategies for firms' greater operational efficiency and service effectiveness (Nonaka, 1994; Spender, 1992). This thesis is thus theoretically grounded on a knowledge-based perspective.

In order to investigate the channel of knowledge acquisition of maritime operators, the two other most influential theoretical perspectives of strategic management, i.e. social network embeddedness and co-opetition strategy were applied. This is based on the previous contention which highlights the crucial role of differential inter-organisational relationships in sharing knowledge between firms. Strategic management literatures address that a highly dense or strongly tied position of a firm in a co-operative network facilitates the better exchange of knowledge between firms (Granovetter, 1985; Uzsu, 1997). Co-opetitive relationship with other players in the network also promotes the more active exchange of knowledge between players (Tsai, 2002).

As maritime logistics operators work within their own business networks by being vertically and horizontally inter-connected to each other, they may have a lot of opportunities for learning through interaction with the world-wide co-operative networks. Thus, the inter-organisational relationship perspective may explain the way to acquire knowledge in maritime business discipline. With the acknowledged informational benefits of the co-operative network, we regard the network embeddedness (e.g. high density and strong ties) as the first source of knowledge acquisition for maritime logistics operators.

Having been drawn from the above strategic theories, this research developed a conceptual framework which shows the relationships between inter-organisational network embeddedness, knowledge acquisition and maritime logistics value. The dimensions of the inter-organisational network embeddedness for knowledge acquisition were assumed as follows: structural and relational co-operative network

embeddedness (i.e. dense and strong network ties), and co-opetition in the network. The conceptual model also assumed the positive influence of the acquired knowledge on maritime logistics value. The indicators that represent the maritime logistics value are reducing costs and time, flexibility, responsiveness, and reliability of maritime logistics services.

8.2.2 Verifying the Conceptual Model

A qualitative research method was employed for the empirical examination of the conceptual model. The qualitative methods included both an explorative case study and two rounds of the Delphi survey method. The explorative case study utilised an in-depth face-to-face interview method with a semi-structured questionnaire. A total of nine cases of maritime logistics companies in Korea were included for the interview. The two rounds of the Delphi survey were then conducted by the participation of the panel of experts in the Korean maritime logistics industry. A questionnaire measured by a five point Likert scale was distributed to the panel throughout the two stages of the survey. A total of fifty responses in the first round and thirty two in the second round of the survey were used for the empirical verification of the conceptual model. All of the respondents who participated in both the case study and Delphi survey focused their discussion on the Korean maritime logistics industry.

To be more specific, in relation to the first part of the conceptual framework (i.e. sources of knowledge acquisition), both the case study and Delphi survey analysis ensured that Korean maritime operators acquire knowledge through the co-operative networks where they are densely and closely embedded. Thus, the findings of this thesis may ensure the continued role of network embeddedness in facilitating knowledge sharing between maritime business operators. This result is consistent with the previous findings in business management, which point out the effectiveness of structural and relational network embeddedness on the greater knowledge exchange between players in a network. The informational effectiveness of co-opetition in the network was also partially supported: in other words, the ‘equally high’ co-opetition in the network of Korean maritime operators has a positive effect on their knowledge acquisition. This result also supports the existing literature in strategic management which highlight that co-opetitive strategy facilitates inter-organisational learning and knowledge exchange between firms (Lado et al., 1997; Tsai, 2002).

The positive influence of the acquired knowledge on maritime logistics value was strongly verified by the empirical findings of the two analytic methods. All of the interviewees in the case study and the panel of experts in the Delphi analysis stressed that the acquired knowledge facilitates the enhancements in reducing lead time and costs, and offering flexible, responsive and reliable services of Korean maritime operators. These results also strongly support the previous findings in business management disciplines.

The empirical findings of this thesis may indicate that strategic management theories and practices that can help to examine the source of competitive advantage in the business management discipline could be robustly applied to the maritime logistics disciplines in investigating the way to improve their logistics value. Thus, the empirical attempt of the thesis could provide a potential method for finding the most suitable strategy which enables individual maritime logistics companies to solve their other own, varied managerial problems. In this regard, this thesis could contribute to the further development of maritime logistics operators' strategy at various levels.

8.3 PROPOSITIONS

This section discusses whether the empirical findings from both an explorative case study and the Delphi survey analysis conducted in the Korean maritime transport industry are in line with the theoretical model, and suggests propositions in accordance with the implied relationships contained in the conceptual model.

- **Sources of Knowledge Acquisition**

An inter-organisational relationship perspective identifies that a social network is a crucial resource with which firms can share and transfer knowledge among organisations (Gulati, 1999; McEvily and Zaheer, 1999). The knowledge transfer may vary depending upon a structural and relational level of network embeddedness where firms are located in. It is commonly agreed that firms that establish dense and strong ties with other actors in a co-operative network can acquire more knowledge than those that do not (Gulati, 1999; Gnyawali and Madhavan, 2001). The first source of knowledge acquisition of this study is founded on such a discussion of previous studies.

All of the respondents in the explorative case analysis mentioned that the network density and tie strength in the co-operative networks of Korean maritime operators may have a positive influence on the knowledge acquisition of maritime operators. The panellists in the Delphi survey also addressed that Korean maritime operators are acquiring knowledge through the greater numbers of network tie (i.e. high density) and keeping close relationships (i.e. strong tie) with their co-operative partners. In particular, it was identified that shipping lines which score the highest mean rating in the Delphi survey can gain the most knowledge; and port terminal operators and freight forwarders are also acquiring knowledge through strong ties with their partners. Thus, shipping lines which were most enthusiastic about co-operating with other organisations in their business network appeared to get more knowledge than other sectors of operators.

The above results investigated in the case study and the Delphi survey indicate that a maritime operator which makes excellent use of its relationship with other firms by being embedded in a social network and engaging in co-opetition in the network can acquire more information and knowledge. This is consistent with the previous findings demonstrated in the above, which stress the strategic significance of a social network in sharing resources for maritime logistics operators.

Having the above theoretical examination and empirical findings in mind, this thesis suggests the following propositions:

Proposition 1: *The extent of co-operative network among maritime operators is positively associated with the level of knowledge acquisition.*

P₁₁: *The greater number of ties a maritime operator has in its co-operative business network, the greater the positive effect on its knowledge acquisition.*

P₁₂: *The stronger ties a maritime operator has in its co-operative business network, the greater the positive effect on its knowledge acquisition.*

The assumption about the role of co-opetition in the network in facilitating knowledge acquisition, i.e. the second source of knowledge acquisition, is based on a number of previous works which identify the informational benefits from simultaneous

competition and co-operation, i.e. co-opetition. In particular, Lado, Boyd and Nalón (1997) and Tsai (2002) stress that the co-opetition which has simultaneously high competition and high co-operation maximises greater knowledge sharing between organisations than when a certain strategy of the two inter-relationships is solely focused in an unbalanced manner.

In the explorative case study, the positive effectiveness of co-opetition in the network on knowledge acquisition was generally supported. Yet one interviewee from a port terminal operator expressed the different view that due to extremely high competition, they could not acquire knowledge from co-opetitors as much as they would like. This implies that the ‘competition-dominant’ co-opetition may not facilitate the knowledge acquisition between actors in the co-operative network.

The above findings are more detailed in the results of the Delphi analysis. The results reveal that shipping lines with ‘equally high’ co-opetitive relationships (i.e. high co-operation and high competition) acquire more knowledge than the other two maritime operators whose co-opetition is more competition-dominated. The result of port terminal operators and freight forwarders in acquiring knowledge through co-opetition in the network indicates that the ‘competition-dominated’ co-opetition is not very helpful in acquiring knowledge in the network due to the extreme nature of their competition. These results are consistent with the findings from the interviewee quoted above.

There exists, however, a contradiction about the findings that are concerned with the case of freight forwarders and port terminal operators between the two empirical methods. The interviewees from port terminal operators, except for the one interviewee indicated above, and all of the freight forwarding companies examined in the case study answered that, although they were less enthusiastic about co-operating with other companies by being more likely to establish short-term and informal forms of co-operation, and although the extent of their competition is generally high, the co-opetition facilitated the knowledge acquisition from other companies. Thus, those companies included in the case study supported the positive effectiveness of the ‘competition-dominated’ co-opetition on knowledge acquisition. On the other hand, in the Delphi analysis, such a positive effectiveness was not supported, as the analysis

revealed that the ‘competition-dominated’ co-competition of port terminal operators and freight forwarders was not helpful in acquiring knowledge from their partners.

It is therefore difficult to decide which of the two contradictory results would be more persuasive. As per the size of the sample used in each analysis, only three samples in each of the three respective business sectors were used in the case study; yet in the Delphi analysis, by contrast, a greater number of respondents were used. In addition, the result of the Delphi analysis was derived from the samples consisting of professional expertises in the field. Thus it is believed that the Delphi analysis could be more accurate and reliable. In this regard, this study would follow the findings from the Delphi analysis in judging the research results, and accordingly suggests the following proposition. The possible debate in relation to the different results would remain as a further research issue, and could be quantitatively investigated with sufficient company data.

Proposition 2: *The extent of co-competition in the network is positively associated with the level of knowledge acquisition when maritime operators proactively co-operative with each other, rather than when they do not. More specifically, ‘equally high co-competition’ (i.e. high in both competition and co-operation) in the network has a positive effect on knowledge acquisition of maritime operators.*

- **Knowledge Acquisition Performance: Maritime Logistics Value**

Much of the previous works ensure that knowledge acquisition contributes to the reduction of costs, price, operational time (i.e. efficiency) and the enhancement of firms’ responsiveness, flexibility and reliability (i.e. effectiveness) (Nonaka, 1990; Grant, 1996; Li and Calantone, 1998; Autio, Sapienza and Almeida, 2000; Tsai, 2001; Zhao, Droge and Stank, 2001). Being based on the previous literatures, this study suggests the improvement of maritime logistics value (i.e. improvement of organisational efficiency and effectiveness) as the performance of knowledge acquisition of maritime operators.

The result from the case study verifies the positive relationship between knowledge acquisition and maritime logistics value. All of the interviewees in the case analysis

agreed that the acquired knowledge from other firms facilitates more efficient and effective business activities of Korean maritime operators. The experts of the panel in the Delphi analysis also ensured that knowledge acquired through a co-operative network helps to provide a maritime logistics service in a way that is economically advantageous and more quick, flexible, responsible and reliable.

To be more specific, shipping lines were observed to acquire more knowledge than other types of maritime operators through their high levels of co-operation and co-opetition. The excellence of shipping lines in acquiring knowledge has consequently resulted in the highest level in improving maritime logistics value among maritime operators. Port terminal operators and freight forwarders, despite the relatively lower level of their practices, can also improve operational efficiency and service effectiveness through engaging in knowledge acquisition. Furthermore, these findings may also reflect the successive stages of the positive relationships between the co-operative/co-opetitive network embeddedness, knowledge acquisition and maritime logistics value, which were proposed in the conceptual model.

To briefly summarise this section, the empirical results from both the case study and Delphi analysis strongly support the previous findings by indicating that the acquired knowledge is helpful in reducing business costs and lead time, and improving service responsiveness, flexibility and reliability. Therefore it is believed that knowledge acquisition has a positive impact on the improvement of maritime logistics value. The relevant proposition may be suggested as follows.

Proposition 3: *The extent of knowledge acquisition of maritime operators is positively associated with the improvement of maritime logistics value.*

The aforementioned positive relations between the empirical findings of the current study and previous works are summarised in Table 8.1. This thesis attempts to borrow the most predominant strategic management theories and practices from the business management domain and apply them to maritime logistics disciplines. As can be seen in the Table, it is revealed that a number of previous works in strategic management can be well applicable to the maritime logistics strategy in this study.

Table 8. 1 Relation between the Empirical Findings and Previous Studies

Section	Empirical Findings of the Current Study	Previous Studies
Sources of knowledge acquisition	The positive relationship between co-operative network embeddedness and knowledge acquisition	Coleman (1990); Krackhardt (1992); Chen and Miller (1994); Valente (1995); Gulati (1999); Rowley, Behrens and Krackhardt (2000); Uzzi (1997); Inkpen and Dinur (1998); McEvily and Zaheer (1999); Begrebs abd Krackhardt (2000); Gnyawali and Madhavan (2001)
	The positive relationship between co-opetition in the network and knowledge acquisition	Lado et al. (1997); Tsai (2002)
Knowledge acquisition performance	The positive relationship between knowledge acquisition and maritime logistics value	Nonaka (1990); Sanchez and Mahoney (1996) ; Grant (1996); Li and Calantone (1998); Tsai (2001); Venkatraman (2001); Zhao et al. (2001); Wu and Chou (2007)

Source: Compiled from various sources.

Firstly, the inter-organisational learning perspective, which highlights the informational benefit through a firm's social network embeddedness (Coleman, 1990; Krackhardt, 1992; Chen and Miller, 1994; Valente, 1995; Gulati, 1999; Rowley, Behrens and Krackhardt, 2000; Uzzi, 1997; Inkpen and Dinur, 1998; McEvily and Zaheer, 1999; Begrebs abd Krackhardt, 2000; Gnyawali and Madhavan, 2001), was applied extensively in order to explain the first channel of knowledge acquisition of maritime operators. The empirical findings were in line with the previous contentions.

Secondly, a co-opetitive relationship perspective was adopted to investigate whether competition in the network may promote the positive influence of co-operative network embeddedness on the knowledge acquisition of maritime operators. The empirical results of this thesis ensured that a maritime operator which has a high level of both cooperation and competition at the same time with other players (i.e. highly balanced co-opetition in this thesis) can maximise the informational benefit of co-opetition in the network. This finding is in line with the works of Lado et al. (1997) and Tsai (2002).

Finally, the positive influence of knowledge acquisition on maritime logistics value was grounded from the previous contention which investigates the positive link between knowledge acquisition and organisational performance, e. g. organisational efficiency and effectiveness and innovative capability (Nonaka, 1990; Sanchez and Mahoney, 1996; Grant, 1996; Li and Calantone, 1998; Tsai, 2001; Venkatraman, 2001; Zhao et al.,

2001; Wu and Chou, 2007). The results of the empirical work of this thesis indicated that the knowledge acquisition of maritime operators throughout co-operative/co-opetitive networks facilitates the improvement of maritime logistics value. Therefore, this part of knowledge acquisition performance also strongly supports the existing contentions in business management disciplines.

8.4 RESEARCH QUESTIONS REVISITED

The empirical investigation of this study answered the following two research questions.

***RQ1:** How could maritime operators acquire the knowledge for maritime logistics value?*

This thesis applied an inter-organisational relationship perspective in investigating the source of knowledge acquisition of maritime operators. As indicated in the empirical findings, it was revealed that the maritime operators in Korea acquire useful knowledge, (e.g. market- and firm- specific knowledge in this study), through being embedded in dense and strong co-operative networks and ‘equally high’ co-opetition in the network. Therefore, the first research question would be well answered by the above results.

These results could give meaningful insight into the significance of the effective administration of inter-organisational co-ordination in gaining knowledge-based advantages. Inter-organisational co-ordination is referred to as linking or managing inter-organisational relationships to achieve desired performance outcomes (Gittell and Weiss, 2004). The principal mechanism of the inter-organisational coordination in this thesis is a co-operative/co-opetitive network among maritime operators. This is based on the previous contention that firms are co-operating with their competitors through a variety of social networks, and as a result such a relationship may generate a lot of knowledge-based benefits.

The results of this study indicate that the higher extent of co-operation has a positive impact on knowledge acquisition. In particular, the higher numbers of and strength in ties in a network would be the central relational resource in facilitating the knowledge acquisition of maritime operators. Secondly, given the positive relationship between co-operation in a network and knowledge acquisition, inter-organisational competition in

the network promotes more vigorous knowledge sharing between the proactively cooperating parties. However, despite such a positive effectiveness of relational resource on knowledge acquisition, it is also evident that there may be a risk of too much intense competition harming the smooth knowledge exchange, as discovered from the empirical findings. This implies that the balance between cooperation and competition would also be a critical strategic consideration. In this sense, the empirical work of this thesis reminds us of the significance of successful management of inter-organisational relationship, since the relational benefits may differ depending on how an organisation can effectively administrate the inter-organisational competition and cooperation.

RQ2: How could the acquired knowledge improve maritime logistics value, and is knowledge management strategy a desirable strategic alternative for maritime operators, in order for them to improve maritime logistics value?

In order to answer the second research question, the current study considered operational efficiency and service effectiveness as the indicators of maritime logistics value, and examined whether the acquired knowledge through the networks may have a positive effect on the improvement of the aforementioned factors.

The empirical results of the case study and Delphi analysis strongly ensured that the acquired knowledge is helpful for Korean maritime operators in enhancing maritime logistics value, by reducing business costs and lead time (i.e. operational efficiency) and improving service responsiveness, flexibility and reliability (i.e. service effectiveness).

In light of the theoretical and empirical findings of the research, it is believed that the knowledge management strategy would be the best desirable strategic option for maritime operators to achieve their strategic goals. In the case study, all of the interviewees mentioned that they need a new strategic direction to successfully cope with the current environmental challenges, and an effective knowledge management strategy would be the most important strategic weapon in improving their logistics values. The panellists in the Delphi survey analysis also stressed the significance of a knowledge management strategy in improving maritime logistics value and gaining competitive advantage of maritime operators. In this sense, the effectiveness of knowledge management strategy in enhancing maritime logistics value has been well

verified by both the managers and professional experts in the Korean maritime logistics industry. These findings therefore may be a good answer to the second research question.

8.5 STRATEGIC IMPLICATIONS

The findings of this study offer strategic implications respectively to each sub-section in the maritime industry. In this section, in-depth strategic implications and suggestions are proposed for the sub-sectors on the basis of the empirical results of this study.

8.5.1 Shipping Lines

The empirical findings reveal that Korean shipping lines passionately share knowledge with other organisations by administrating well-balanced inter-firm co-operative and competitive tension. As a result, the effectiveness of knowledge acquisition was the highest when compared to other sectors of maritime business. Those results ensure that a knowledge management strategy would be a fruitful option for shipping lines, and would contribute towards the maximisation of maritime logistics value, and social network embeddedness and co-opetitive relationships would be a significant strategic tool in facilitating organisational learning.

However, shipping lines in Korea are still confronted with problems that must be solved under the dynamically changing and unstable world economy. For example, as the recent decreased container volumes in global trade, affected by the global economic crisis, have rarely shown an upward tendency, ship fleets are over supplied and consequently freight rates continuously decrease. Furthermore, the increase in shipping alliances and mergers and acquisitions between leading global shipping lines has caused a concern that the shipping industry would become an oligopoly.

Under the current condition like the above, the importance of effective knowledge management strategy is even more significant. Shipping lines need to pay greater attention to market trends, and accurately forecast the market situation from a medium- and long-term perspective. Shipping companies should also respond to the

environmental threats, and administrate managerial risks in a more enthusiastic, flexible and effective manner. Those activities can be achieved by successfully implementing the knowledge management system.

As shown in the results from the case study, despite the fact that Korean shipping lines have made great efforts to increase individual market share by proactively co-operating and sharing information with each other, it is true that their understanding of the value of knowledge management and the extent to which they implement the knowledge management system in a systematic way is still at a rudimentary stage. Thus, it is more necessary that they should recognise the significance of the intellectual capital in refining their administration and flexibly and swiftly responding to rapidly changing environments. In addition, they need to design unique plans of their own to effectively apply the knowledge management system to specific shipping operations, in order to maximise the effectiveness of the system. The successful implementation of the strategy may contribute to the creation of differentiated capability and organisational innovation, and would be a greater source of maximisation of maritime logistics value and their sustainable competitive advantage.

8.5.2 Port Terminal Operators

The empirical examination of this study also ensures that port terminal operators in Korea gain a lot of benefits from social networks in acquiring knowledge, and from the application of the acquired knowledge in enhancing organisational performance, i.e. maritime logistics value. Thus, the effectiveness of a knowledge management strategy and the role of social network relationship in gaining informational benefits in port terminal operation would be well valued by the current research.

However, the level of the benefits from the knowledge management process was lower for port terminal operators than that of shipping lines. For instance, the informational benefit from the dense and strong ties in the co-operative network was lower than that of shipping lines. The effectiveness of the acquired knowledge on maritime logistics value was also slightly lower than the effectiveness showcased by shipping lines. The ineffective practice of port terminal operators may be due to the extremely intensive competition. The seriousness of port terminal operators' destructive competition in Korea has been addressed by most of the managers and the panel of experts who

participated in the interview and survey of this study. The competition encourages port terminal operators to refrain from sharing information or knowledge with their counterparts. Under such delicate circumstances, the refinement of the closed managerial practices of port terminal operators therefore becomes an urgent necessity, in order that they may share knowledge and maximise their common interests with other operators. Furthermore, as revealed in Chapter 6, despite the fact that port terminal operators have taken many advantages from knowledge management, managers of port terminal operators have yet to fully perceive what the knowledge management system is, how they can implement the system, and what the specific merits of the system are. Thus, they need to further comprehend the necessity of the knowledge management system and the great effectiveness of successful knowledge application.

The expected effectiveness of successful knowledge management in port terminal operations in Korea can be described as following. Firstly, port terminal operators can learn the seriousness of their destructive competitive factors which harm their common profits. Secondly, the organisational learning may enable them to sharply diagnose their internal strengths and weakness, and environmental threats and opportunities. Such an analysis may help them to overcome the aforementioned environmental risks and strengthen their good points. They can also grasp the market requirements on their operation accurately by collecting precise information about their customers and relevant market. If the acquired knowledge can be appropriately applied in accordance with a firm's unique circumstances, the firm can create differentiated innovation and gain sustainable competitive advantage. In this sense, the knowledge management strategy is not optional but necessary for successful port terminal operators' survival in the tough competitive marketplace.

8.5.3 Freight Forwarders

In the empirical analysis, it was revealed that the freight forwarders in Korea acquire knowledge through co-operative networks, and they can therefore improve maritime logistics value. Thus, the result also verifies the significance of social network and knowledge management strategy in freight forwarding operations.

However, the willingness to cooperate with other competitors was not very enthusiastic, and as a result, they could not actively share knowledge as best as they can.

Consequently, the extent of the effectiveness of knowledge acquisition was slightly lower than that of shipping lines. In recent times, Korean freight forwarders have also been confronted with serious managerial challenges: for example, the decrease of shipping charge and decline in volume of shipments. As stated in Chapter 3, Korean freight forwarders are mostly small sized. Furthermore, affected by recent global economic slump, a lot of freight forwarders that have poor financial capabilities have recently gone bust. In this crisis situation, freight forwarders are seeking innovative strategic solutions in order to overcome their financial difficulties and survive in the business. Whereas some experts point out that institutional support by the government should be preceded, the most important factor to consider would be to raise the ability to stand up on their own throughout the high efficiency and differentiation in costs and services.

With the above situation, the importance of knowledge management strategy would be mostly stressed. As discussed in previous studies and the current thesis, if freight forwarding companies make all the necessary efforts to gain new and innovative information, and make use of the acquired knowledge in a more systematic and enthusiastic way - for instance, if they cooperate with other competitors in a more proactive way, or if they foster employees to be more learning-based and reform their organisational culture towards more efficient knowledge distribution and application - they can come up with more distinguished and unique services. At the same time, such an effort may contribute to the reduction of business costs and lead time. Consequently, they could gain sustainable competitive advantage in the marketplace as well as add value to the whole logistics integration system.

8.6 CONTRIBUTIONS OF THE RESEARCH

This research may make a contribution to the literature of the maritime business studies in the following forms.

- **Development of a New Strategic Model for Maritime Logistics Operators**

The existing literature has yet to systematically suggest the way to improve maritime logistics value. This study may fill the gap by applying the most appropriate practice to maritime operations. This study develops a knowledge management model for maritime logistics operators, and diagnoses the effectiveness of the strategy in creating and

sustaining maritime logistics value. As verified in the empirical findings, a knowledge management strategy would be one of the most useful strategic alternatives in coping with the current demands for effective maritime logistics management. This attempt may contribute to the strategic development of maritime operators in determining the source of competitive advantage and improving organisational performance.

- **Application of Strategic Management Theories to Maritime Disciplines**

It has been just a few years since the concept of maritime logistics was newly introduced and given a great deal of attention by scholars and managers; this occurred after maritime business stakeholders began to recognise the maritime transport system as a systematic element in the global logistics integration system (Mason and Lalwani, 2004; Panayides, 2006). Due to its short academic history, maritime logistics has no well established theoretical background of its own – a background which systemically defines what are the strategic goals to be achieved by maritime operators, and how maritime logistics operations can be administrated in order to accomplish their goals and add value to the entire logistics integration system.

As maritime logistics is primarily derived from the business management field (Hill, 2001), this thesis attempts to transfer and apply the most predominant strategic management theories and practices from the business management domain to maritime logistics disciplines. As the empirical work of the thesis has drawn upon meaningful strategic insights into the effectiveness of knowledge-based strategy in maritime logistics operations, it is therefore believed that this study may overcome the shortage in theories and empirical verification of maritime strategies, and consequently may contribute to the academic development of maritime research. Therefore, this can also fill the research gap that few empirical attempts have yet to empirically examine, i.e. the effectiveness of the knowledge management strategy in the maritime logistics field. In addition, this research could bolster the academic linkages between strategic management theories and maritime business studies.

- **Expansion on Industrial Scope of Strategic Management Studies**

From a business management research's point of a view, the maritime business sector has been relatively neglected in applying business theories and empirically examining the maritime business cases. In this sense, this research may also give strategic management scholars a meaningful knowledge of maritime logistics strategy, through

expanding the industrial scope of the applicability of knowledge management strategy into the field of maritime transport business.

- **Importance of Inter-organisational Relationship**

Although earlier studies in maritime transport and logistics have stressed the importance of knowledge resource, they have not clearly defined how maritime operators acquire knowledge resource from their external channels. This thesis focuses on the role of inter-organisational relationships of maritime operators in sharing knowledge with each other. In other words, this thesis attempts to examine the effective inter-organisational co-ordination mechanism within a social network of maritime operators for effective knowledge acquisition. In order to investigate how maritime operators co-ordinate inter-organisational relationships in their co-operative/co-opetitive network, this thesis examined the extent of both cooperation and competition in a network, and their influence on knowledge acquisition. This influence was examined on the basis of a structural and relational coordination mechanism in a social business network.

The empirical result highlights that multiple co-operative linkages with other organisations promote the acquisition of knowledge and improvement of their logistics value. This indicates that maritime operators should perceive the significance of the effective inter-organisational co-ordination, since it may play a significant role as a social capital which exists out of the firm and can bring a lot of informational benefits to them. In this sense, this study may more thoroughly explain the source of maritime operators' competitive advantage, by expanding the managerial interest from intra- to external- organisational level.

- **Methodological Stance**

As an initial stage of the empirical application of the knowledge management strategy, the qualitative approach was used in order to deduce sufficient comprehension of practitioners of the maritime industry about the significance and effectiveness of the knowledge management strategy in maritime logistics. Such a procedure may contribute to the gaining of a foothold towards further quantitative analysis with rigorous mathematical evidence. Thus, the empirical results of this research play a bridge role to boost the quantitative empirical analysis of knowledge-based strategy of maritime logistics management.

8.7 LIMITATIONS OF THE RESEARCH

Nevertheless, there are inevitably some limitations to this research; they are as follows:

- **Focusing on External Factors of Knowledge Acquisition**

When investigating the sources of knowledge acquisition of maritime operators, this thesis only considers the context of inter-organisational relationship, being grounded on the previous studies which highlight the importance of inter-organisational relationship in transferring knowledge among actors. But the fact that intra-organisational sources of knowledge acquisition and creation are neglected may constitute a limitation in the research.

- **Small-sized Case Samples**

When conducting the explorative case study, a total of nine company interview data was used. Although the companies which responded to the interview are major players in Korean maritime industry and the interviewees have a considerable understanding and insight on the field, the size of the sample can be regarded as very small, which can cause a certain level of bias. Such a small number of respondents may be due to the time and resource constraints of the current research. Thus, it is recommended that a larger sample be collected in future research, in order that richer information of the field can be reflected.

- **Shortcomings of the Delphi Method Per Se**

Despite the numerous methodological strengths of the Delphi analysis as described in Chapter 5, the method has been criticised for the following several aspects (Rowe, Wright and Bolger, 1991; McKinnon and Foster, 2000): difficulty in clearly defining the qualification or requirement of expertise; possible personal biases of the researchers in selecting the panel; and the possibility of careless responses from the panel due to the anonymity component, etc.

Although the current research has tried to cover all the bases in qualifying and selecting panel by defining a strict criterion to be a panel member and getting the most deliberative answers from the reliable experts, the method cannot escape exposure to the aforementioned shortcomings of the method of its own. It is believed that future

research may overcome the methodological weaknesses by combining other influential research methods with the Delphi method.

- **Generalisation**

As this study focuses solely on the Korean maritime industry, limitations regarding generalisations of the empirical results may also exist.

8.8 DIRECTIONS FOR FUTURE RESEARCH

The work of this study may contribute to the development of further research issues, to be expanded in the future as the following aspects.

Firstly, this thesis has investigated the effectiveness of inter-organisational partnership mechanism on knowledge acquisition of maritime operators. Whereas the current research focuses solely on an external source of knowledge acquisition, in future research, the internal source of knowledge acquisition or creation could be investigated. For example, intra-organisational determinants such as organisational structure and inter-unit relationships within an organisation can be considered as another source of knowledge acquisition.

Secondly, this research examines the positive effectiveness of knowledge acquisition on maritime logistics value, but it does not examine how the acquired knowledge is internally applied. Future research can transfer the focus into the inside of a firm and discuss the process of knowledge application of the firm on an intra-organisational level. For example, a role of ‘organisational learning capability’, such as absorptive capacity, on the effective knowledge application can be a meaningful variable in investigating how to apply organisational knowledge.

Thirdly, this study considers all the sectors of maritime business, i.e. port terminal operators, shipping lines and freight forwarders. This attempt may be beneficial in that the results can cover the broader sectors of maritime business strategy. Future research can narrow the focus to the strategy of respective individual sectors: i.e. port-, shipping- and freight forwarding-specific knowledge management strategy. Such an attempt

would contribute to the development of each business's own knowledge management system, according to the different characteristics of each business type.

Fourthly, this research employed qualitative methods, i.e. case study and the Delphi survey method, when examining the proposed relationships of the conceptual model. Such a work may contribute to the development of relevant hypotheses about the knowledge management strategy of maritime operators, and the hypotheses can be statistically tested by the usage of a quantitative research method.

Finally, being based on the empirical findings of Korean maritime industry in this study, future research may expand their regional scope of data collection to other countries, where the strategic importance of maritime logistics value becomes greater. This work may contribute to the generalisation of the results of this study.

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